



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

October 27, 2021

Group Chairman's Factual Report

OPERATIONAL FACTORS

ANC21FA069

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A. ACCIDENT

Location: Ketchikan, Alaska
Date: August 5, 2021
Time: 1050 Alaska daylight time¹
Airplane: De Havilland DHC-2 MK.1 (Beaver), N1249K

B. OPERATIONAL FACTORS GROUP

David Lawrence Group Chairman Operational Factors Division (AS-30) National Transportation Safety Board (NTSB)	Thomas Johnson Aviation Safety Inspector (ASI) Juneau Flight Standards District Office Federal Aviation Administration (FAA)
James Larson Director of Operations Southeast Aviation LLC Ketchikan, Alaska	Paul Suffern Meteorologist Operational Factors Division (AS-30) NTSB

C. SUMMARY

On August 5, 2021, about 1050 Alaska daylight time, a De Havilland DHC-2, N1249K, was destroyed when it was involved in an accident near Ketchikan, Alaska. The airline transport pilot and five passengers were fatally injured. The airplane was operated by Southeast Aviation LLC, as a Title 14 *Code of Federal Regulations (CFR)* Part 135 sightseeing flight.

D. DETAILS OF THE INVESTIGATION

On August 5, 2021, notification of an Operations (Ops) launch occurred at 1827 central daylight time (CDT). From 1830-2230 CDT, multiple FAA requests for data on the company, pilot and airplane were made. Pilot background checks were made, and travel was initiated on August 6, 2021.

On August 7, 2021, the Ops Group was formed and obtained the logbooks for N1249K. The logbooks were delivered to the NTSB Investigator-in-Charge (IIC) and Structure Group Chairman. The Group visited the offices of Southeast Aviation LLC and met the owner of the company. The Director of Operations and owner were briefed on the NTSB process and provided the company a request for data and a schedule for interviews.

The Group participated in the NTSB organizational meeting and an FAA ASI was assigned to the Ops Group. The Ops Group then began obtaining additional FAA company and pilot data. Southeast Aviation LLC was given Party Status and its Director of Operations was assigned to the Ops Group.

¹ All times are Alaska daylight time (AKDT) based on a 24-hour clock, unless otherwise noted.

On August 8, 2021, the Ops Group obtained witness contact information for follow-up and conducted interviews at Southeast Aviation LLC offices in Ketchikan, Alaska of the company owner, Director of Operations, and a part-time pilot. Additional documentation for the company was received, including company manuals and the Operations Specifications. Flight times for the day of the accident were obtained as well as the most recent drug testing for the accident pilot (following a July accident in a different DHC-2 MK.1, flown for Southeast Aviation LLC). A hard copy of the “Ketchikan Commercial Operators Letter of Agreement” dated January 15, 2009 (revised May 8, 2021) was obtained which detailed the voluntary procedures for sightseeing flight in the Misty Fjords National Monument area. In addition, the Ops Group flew with the IIC in a Temsco helicopter flight out to Big Goat Lake (where the accident flight landed during its final flight). The flight returned to Ketchikan via an approximate route the accident flight took on the accident flight and reviewed the accident site (IIC documented the flight via video).

On August 9, 2021 the Ops Group conducted witness interviews to gather and document observations from pilots who operated in the Misty Fjords National Monument area near the time of the accident, which included a pilot who assisted in grid-searching the area with the United States Coast Guard. The Ops Group interviewed the Southeast Aviation LLC’s Chief Pilot and gathered additional training documents for the accident pilot. Additional Flight Service Station (FSS) audio and FAA regulatory data were requested.

On August 10, 2021, the Ops Group interviewed the FAA Principal Maintenance Inspector (PMI) and the Principal Operations Inspector (POI) for Southeast Aviation LLC. The Ops Group also conducted an additional witness interview of a pilot flying in the Misty Fjords area and completed the Ops Group Field Notes.

On September 27, 2021 the Ops Group Chairman accompanied the NTSB Meteorology Group Chairman to the National Weather Service (NWS) office in Juneau, Alaska. On September 28, 2021 the Ops Group Chairman and Meteorology Group Chairman met with FAA personnel at the Flight Standards District Office (FSDO) in Juneau, Alaska.

On September 29, 2021 the Ops Group traveled to Ketchikan, Alaska and participated in a tour of the Ketchikan FSS located at Ketchikan International Airport (KTN) and Air Traffic Control (ATC) interviews.

On September 30, 2021, the Ops Group conducted additional interviews of the owner of Southeast Aviation LLC and Director of Operations and monitored the virtual FAA Alaska Air Safety Meeting. The Ops Group reviewed multiple Ketchikan air tour operator’s risk assessment forms.

E. FACTUAL INFORMATION

1.0 History of Flight

1.1 First Misty Fjords Flight

The pilot began his assigned duty day for Southeast Aviation LLC in Ketchikan, Alaska about 0600 on August 5, 2021. He had two scheduled air tour flights to the Misty Fjords National

Monument² that morning; one scheduled to depart at 0800 and another scheduled to depart at 1000.³ According to the Southeast Aviation LLC owner, the pilot also had a third trip scheduled for 1200 to Hyder, Alaska to pick up passengers and cargo.⁴

The owner stated that about 0630 he and the pilot reviewed the FAA Weather Cameras, Foreflight and the Windy website and the owner said the weather looked decent. Prior to leaving in a company van to pick up the passengers about 0725 for the first flight, the owner said he and the pilot looked at the FAA Weather Cameras and the pilot said to go ahead and pick up the passengers, and the pilot said, “the weather looked good.”

According to Spidertracks⁵ data for the airplane, the first flight to the Misty Fjords National Monument departed Ketchikan Harbor Seaplane Base, Ketchikan, Alaska (5KE) about 0752.⁶ There were six passengers onboard the first flight; four were passengers on the Holland America MS *Nieuw Amsterdam* cruise ship who had booked their flight through the Ketchikan visitor’s center, and two passengers who had booked their flights online.⁷

Weather at KTN around the time of departure was:⁸

METAR PAKT 051453Z 15006KT 10SM FEW007 SCT021 OVC030 13/13 A2989
RMK AO2 SLP122 HARBOR WIND 11007KT CIG SCTVBKN T01330128 53005 \$=

The pilot flew the outbound portion of the first flight south from Ketchikan around Mountain Point, up the Carrol Inlet and over Ella Lake.⁹ The pilot then flew from the Ella Narrows¹⁰ across Behm Canal toward Rudyerd Bay, eventually landing on Big Goat Lake. About 0846 he departed Big Goat Lake on the return to Ketchikan Harbor Seaplane Base.

² The Misty Fjords National Monument is the largest wilderness in Alaska's national forests and the second largest in the nation, extending 2.3 million acres across Tongass National Forest. The major waterway cutting through the monument, Behm Canal, is more than 100 miles long. The long canal separates Revillagigedo Island from the mainland and provides passage to Walker Cove, Rudyerd Bay and Punchbowl Cove. Source: <https://www.travelalaska.com/Destinations/Parks-and-Public-Lands/Misty-Fjords-National-Monument.aspx>.

³ See Attachment 2 – Flight Manifests.

⁴ Hyder, Alaska is located about 75 miles to the northeast of Ketchikan, Alaska.

⁵ The airplane was equipped with a Spidertracks flight tracking system, which provides real-time aircraft flight tracking data. The flight tracking information is transmitted via Iridium satellites to an internet-based storage location, at one-minute intervals. According to Southeast Aviation LLC interviews, the Spidertracks unit in N1249K had been taken out of N9279Z following that airplane’s July 9, 2021 accident. As a result, raw Spidertracks data for the accident airplane indicated N9279Z for the time period of July 9, 2021 to August 5, 2021. For more information on the July 9, 2021 accident, see Section 2.0 Pilot Information of this Factual Report. The accident airplane was also equipped with ADS-B In and Out. ADS-B Out for the two Misty Fjords flights provided limited returns. For additional information, see Air Traffic Control Group Chairman’s Factual Report in the Docket for this accident.

⁶ For more information on the Ketchikan Harbor Seaplane Base, Ketchikan, Alaska (5KE) and Ketchikan International Airport (KTN), see Section 7.1 Ketchikan Harbor Seaplane Base of this Factual Report.

⁷ The MS *Nieuw Amsterdam* had arrived at Ketchikan harbor about 0700 on August 5, 2021 and was scheduled to depart at 1600 on August 5, 2021. The actual departure time was 1820 on August 5, 2021. Source: Holland America Group Manager, Family Assistance. See also Attachment 3 – Witness Reports.

⁸ KTN was the closest official weather observation site to the Misty Fjords.

⁹ See Section 6.1 Ketchikan VFR Sectional Chart of this Factual Report for the FAA Sectional Chart covering the Misty Fjords and names of the geographic points in the area.

¹⁰ The Ella Narrows connected Ella Lake to the Behm Canal.

On the return portion of the first flight, the pilot flew northwest over Lake Manzoni and south of Walker Cove and began crossing the Behm Canal about 0856 traveling southwest on a heading of 231° at an altitude of 3,140 feet mean sea level (msl) and a speed of 91 knots. He reached the west side of Behm about 0859 on a heading of 230° at an altitude of 3,068 feet msl and speed of 99 knots and about 8 miles north of the Ella Narrows.

There were two FAA Weather Cameras that covered flights operating in the Misty Fjords; the Minx Island Camera was located at the northern portion of Thorn Arm, and the Misty Fjords Camera was located at in the middle of Behm Canal between the entrance to Rudyerd Bay and Ella Bay.¹¹

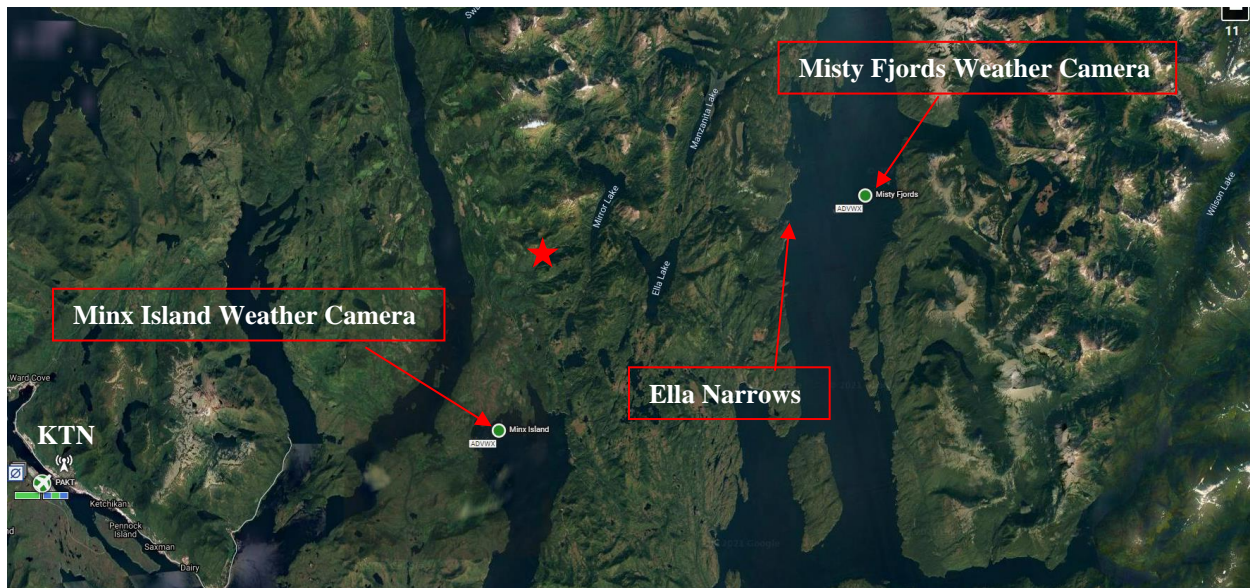


Figure 1: Location of the Misty Fjords and Minx Island weather cameras (red star indicates approximate location where accident occurred).

The Misty Fjords weather cameras recorded the following images looking north, west and south about the time the first flight crossed Behm Canal on the return flight to Ketchikan Harbor Seaplane Base:

¹¹ For more information on the FAA Weather Cameras, see Meteorology Group Chairman's Factual Report in the Docket for this accident.



Photo 1: Misty Fjords weather camera looking north up the Behm Canal at 0858.



Photo 2: Misty Fjords Camera looking west toward the Ella Narrows (indicated by yellow circle) at 0900.



Photo 3: Misty Fjords Camera looking south down the Behm Canal at 0859.

After crossing Behm Canal, the pilot flew over the center of Manzanita Lake and remained north of Mirror Lake. The pilot flew across the Carroll Inlet toward the south end of the George Inlet, back around Mountain Point and northwest toward Ketchikan. The first flight arrived back at the Ketchikan Harbor Seaplane Base about 0921.

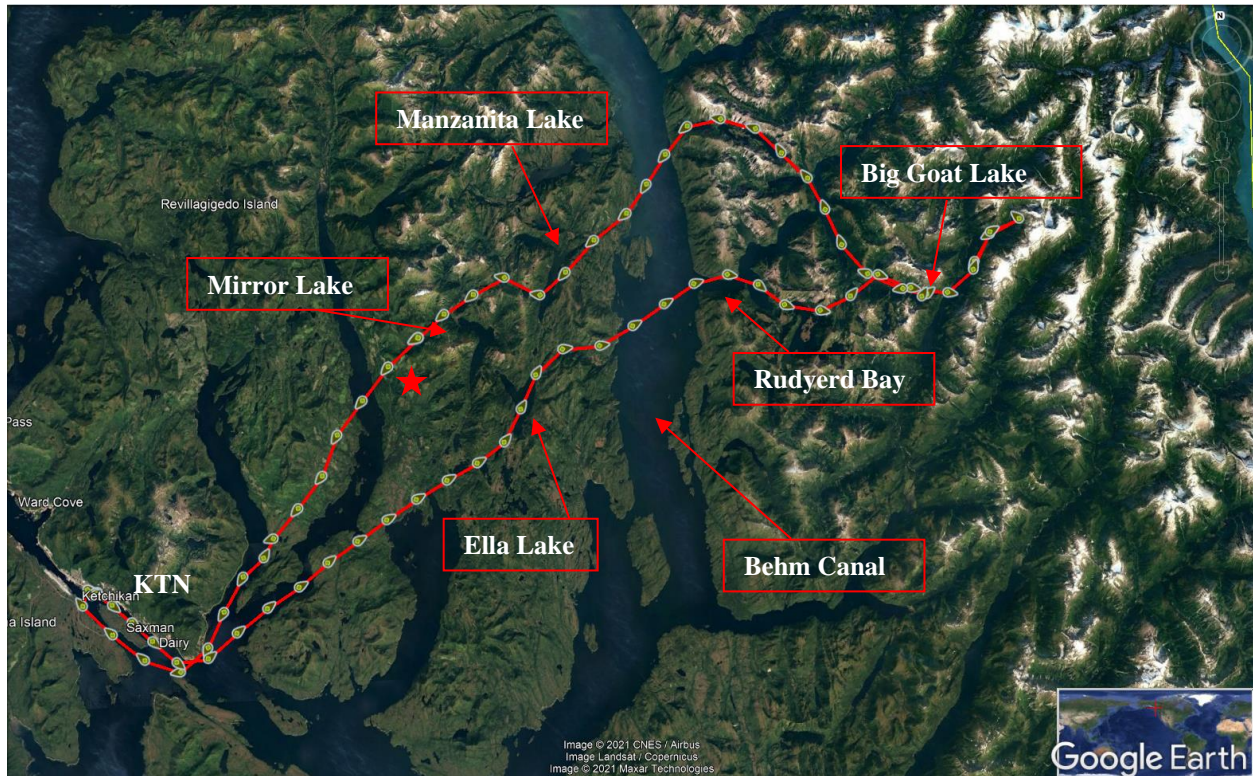


Figure 2: Spidertracks image of N1249K first flight on August 5, 2021. Red star indicates the approximate location of the accident site on the second Misty Fjords flight.

Weather at KTN around the time the first flight returned was:

METAR PAKT 051720Z 12008KT 5SM -RA BR FEW008 BKN015 OVC025 14/13
A2989 RMK AO2 RAB18 P0000 T01390128

According to one of the passengers on the first flight, during the last approximately five minutes of their return flight, the cloud ceiling was dropping rapidly, and the pilot was "ducking" around just a little, apparently to avoid the clouds. By the time the flight landed and they were in the ground transportation to return to their hotel, the passenger said the weather was no longer inviting for a sight-seeing flight. Another passenger on the first flight said that as they approached Ketchikan, the skies became full of clouds and fog.¹²

1.2 Second Misty Fjords Flight

According to the owner of Southeast Aviation LLC, between the first flight and second flight (the accident flight), the owner asked about the weather, and the pilot told him that weather for the Misty Fjords was "good." He also informed the owner to cancel the trip to Hyder, Alaska at 1200 because "he didn't have the ceiling back there for it."¹³

The pilot filed a Visual Flight Rules (VFR) flight plan to Misty Fjords and activated the flight plan with FSS at KTN about 0939, indicating 1 hour and 45 minutes of flight time with two hours and

¹² See Attachment 3 – Witness Reports.

¹³ See Attachment 1 – Interview Transcripts.

15 minutes of fuel, and six persons onboard.¹⁴ There were a total of five passengers onboard in addition to the pilot. All five passengers on the accident flight had arrived at Ketchikan on the Holland America cruise ship *MS Nieuw Amsterdam* that morning. None of the passengers had booked their travel as an excursion with the cruise ship or Holland America.

According to the Carlin Air fueler, the accident pilot requested him to top off the front tank (35 gallons) and fill the center tank to 20 gallons, totaling 55 gallons of fuel onboard.¹⁵

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR			TIME STARTED		SPECIALIST INITIALS	
FLIGHT PLAN		<input type="checkbox"/> STOPOVER						
1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE	
<input checked="" type="checkbox"/> VFR <input type="checkbox"/> IFR <input type="checkbox"/> DVFR	N1249K	DHC2	KTS	5KE	PROPOSED (Z)	ACTUAL (Z)	1740	
8. ROUTE OF FLIGHT								
Misty Fjords 1925								
9. DESTINATION (Name of airport and city)		10. EST. TIME ENROUTE		11. REMARKS				
5KE		HOURS: 1 MINUTES: 45						
12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)		14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE				15. NUMBER ABOARD
HOURS: 2 MINUTES: 15								6/6
16. COLOR OF AIRCRAFT		17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)						

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

Figure 3: Filed flight plan for accident flight.¹⁶

According to Spidertracks data, the pilot departed the Ketchikan Harbor Seaplane Base on the accident flight about 0939. According to the owner of Southeast Aviation LLC, after he had dropped off the passengers from the first flight at their hotel and returned to his office (about 15-20 minutes after the second flight had departed), he noticed that the weather around the Twin Island weather camera “was getting low.”¹⁷

Weather at KTN around the time of departure for the second flight was:

¹⁴ For more information on the KTN Flight Service Station, see Air Traffic Control Group Chairman’s Factual Report in the Docket for this accident, and Section 8.2.1 of this Factual Report.

¹⁵ The fuel load for the accident flight was the same as the first Misty Fjords flight on August 5, 2021. According to the DHC-2 Beaver Airplane Flight Manual (AFM), the fuel capacity for both the front tank and center tank was 35 gallons each. Title 14 *CFR* 135.209(a) stated: *No person may begin a flight operation in an airplane under VFR unless, considering wind and forecast weather conditions, it has enough fuel to fly to the first point of intended landing and, assuming normal cruising fuel consumption (1) During the day, to fly after that for at least 30 minutes.*

¹⁶ Source: FAA.

¹⁷ The Twin Island weather camera is located at the southern portion of the Behm Canal. For additional information on weather cameras, see the Meteorology Group Chairman’s Factual Report in the Docket for this accident.

METAR PAKT 051720Z 12008KT 5SM -RA BR FEW008 BKN015 OVC025 14/13
A2989 RMK AO2 RAB18 P0000 T01390128

The investigation recovered multiple personal electronic devices (PEDs) at the accident site, which were sent to the NTSB Recorders Laboratory in Washington, DC for download and review.¹⁸ The following is a photo taken by a passenger on the accident flight with an iPhone 8 Plus prior to departure:



Photo 4: Photo taken by a passenger on the accident flight with an iPhone 8 Plus prior to departure. Photo depicts the left-side view from the accident airplane and shows the MS *Nieuw Amsterdam*, the Ketchikan shoreline, and rain on the passenger window.¹⁹

The pilot flew the same route outbound on the second flight as he did the first flight, flying from the Ella Narrows across Behm Canal, entering Rudyerd Bay and landing on Big Goat Lake about 1018. About 1027, the accident flight departed Big Goat Lake for the return to 5KE.

¹⁸ Recovered PEDs from the accident site include an iPhone XR, iPhone 11 and iPhone 8.

¹⁹ For additional passenger photos depicting the weather, see Meteorology Group Chairman's Factual Report in the Docket for this accident.

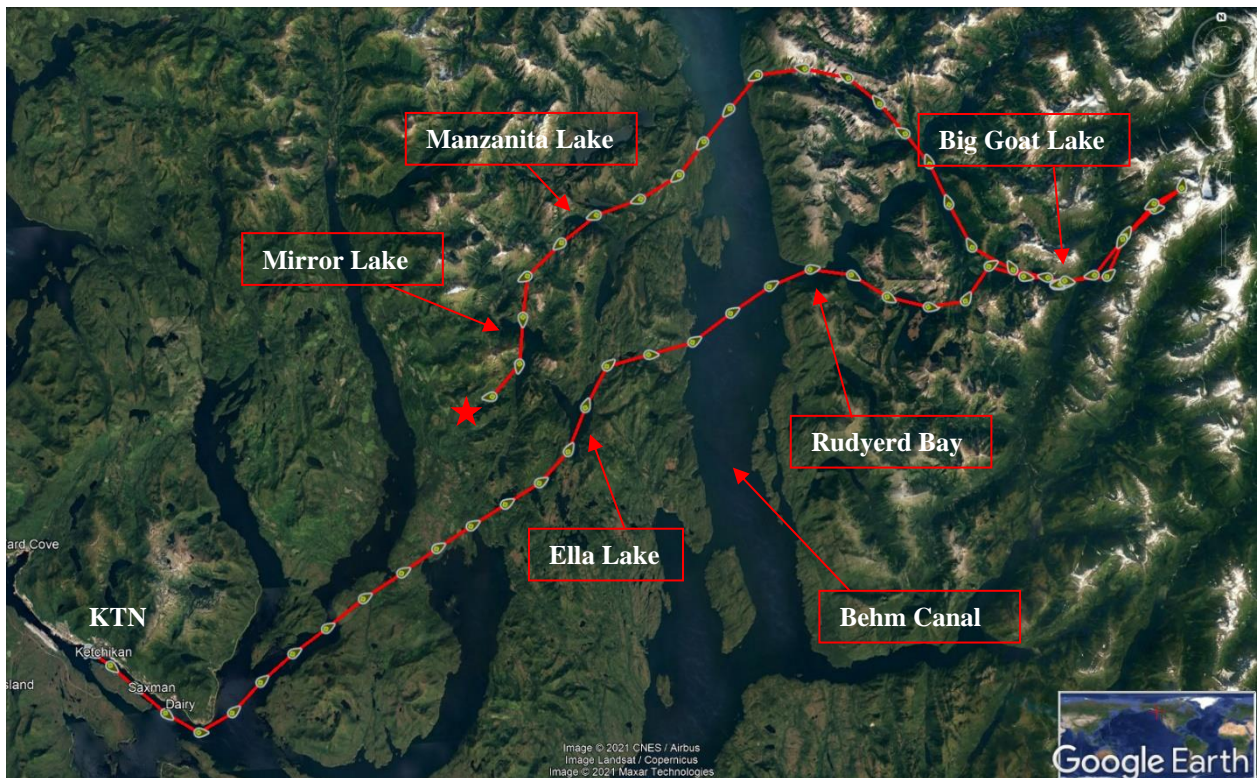


Figure 5: Spidertracks image of N1249K for accident flight on August 5, 2021 (red star indicates approximate location where accident occurred).

The pilot began crossing the Behm Canal on the return flight traveling southwest on a heading of 236° about 1038 at an altitude of 2,914 feet above msl and a speed of 98 knots. He reached the west side of the Behm Canal about 3 miles north of the Ella Narrows about 1040 on a heading of 219° at an altitude of 2,770 feet above msl and speed of 88 knots and.

The Misty Fjords FAA Weather Cameras recorded the following images looking north, west and south about the time the accident flight crossed the Behm Canal on the return flight to Ketchikan Harbor Seaplane Base:



Photo 5: Misty Fjords weather camera looking north up the Behm Canal at 1042.



Photo 6: Misty Fjords weather camera looking west toward the Ella Narrows (indicated by yellow circle) at 1041.



Photo 7: Misty Fjords weather camera looking south down the Behm Canal at 1044.

About 1043 the pilot began crossing the northern portion of Manzanita Lake on a heading of 248° at an altitude of 2,822 feet above msl and a speed of 101 knots. When west of Manzanita Lake, about 1045 the pilot was on a heading of 244° at 2,327 feet msl and a speed of 109 knots when he began a left turn. The pilot began crossing the northern portion of Mirror Lake about 1046 on a heading of 181° at an altitude of 2,192 feet above msl and a speed of 101 knots.

The following are the last two photos taken from an iPhone 11 and an iPhone XR recovered at the accident site:²⁰

²⁰ The approximate directional view of these photos is depicted in Figure 6. For additional passenger photos depicting the weather, see Meteorology Group Chairman's Factual Report in the Docket for this accident.



Photo 8: Photo taken from an iPhone 11 recovered at the accident site. Photo was taken at 1047:11 from the right side of the accident airplane and shows the western arm of Mirror Lake looking to the northwest.²¹

²¹ Additional data from this photo indicated that it was taken at a latitude/longitude of 55°31'25.31"N 131° 9'37.50"W at an altitude of 658.2 meters (about 2,159 feet).



Photo 9: Photo taken from an iPhone XR recovered at the accident site. Photo was taken about 1047 from the right side of the accident airplane and shows the western arm of Mirror Lake looking to the northwest.

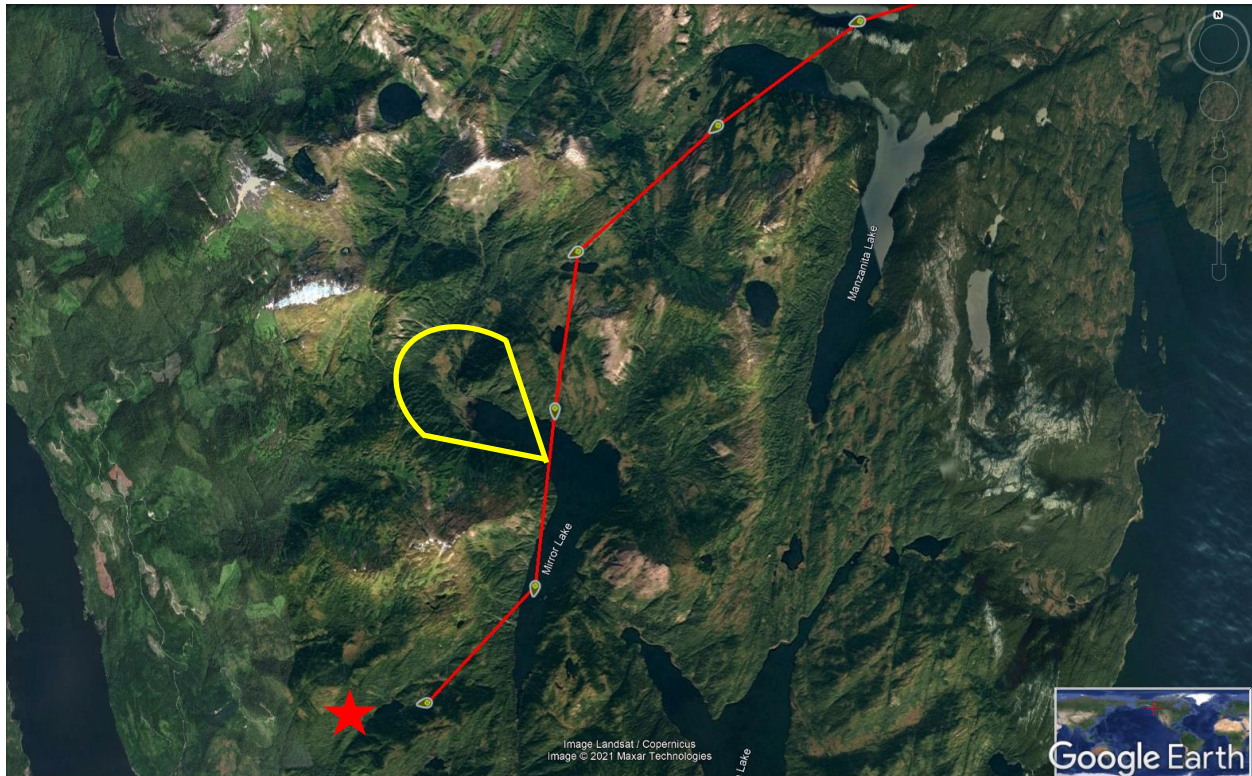


Figure 6: Enlarged Spidertracks view of last portion of accident flight (red star indicates approximate location where accident occurred). Yellow lines depict the approximate view of the iPhone 11 and iPhone XR photos taken about 1047.

While flying south along the west side of Mirror Lake about 1047 on a heading of 190° at an altitude of 2,048 feet msl and speed of 104 knots, the pilot then began a right turn down a valley.

The last Spidertracks return about 1048 showed the airplane was on a heading of 261° at an altitude of 1,730 feet above msl and a speed of 114 knots. The last two Spidertracks returns also showed the pilot flying alongside the northern side of the valley. The airplane impacted heavily wooded, mountainous terrain about 18 miles northeast of Ketchikan, Alaska, and 1.46 miles from the last satellite return at an elevation of about 1,750 feet above msl on the northern side of the valley.²²

The airplane initially impacted a tree about 435 feet from the main wreckage location, and the outboard section of the left wing was located at the base of that tree. The inboard section of the left wing was located in a tree along the debris path, which had a heading of 242° . All major components of the airplane were located in the vicinity of the main wreckage.

Weather at KTN around the time of accident was:

METAR PAKT 051848Z 15007KT 3SM R11/6000VP6000FT -RA BR FEW007
BKN018 OVC025 13/13 A2990 RMK AO2 HARBOR WIND 13010KT VIS 1V3 P0003

²² Google Earth image elevations indicated the peaks of the hills above the accident sight were about 2,300 feet. The FAA VFR Sectional Chart indicated a peak of 2,540 feet msl near the vicinity of the accident site. See Section 6.1 Ketchikan VFR Sectional Chart of this Factual Report.

About 1050, the United States Coast Guard (USCG) Alaska received a 406 Mhz emergency locator transmitter (ELT) signal assigned to the accident airplane. After being notified of an overdue airplane and after learning about reports of an ELT signal along the accident pilot's anticipated flight route, search and rescue personnel from the USCG Air Station Sitka and Temsco Helicopters, Inc. began searching for the missing airplane. The airplane was located about 1120 and USCG rescue personnel reached the accident site later that afternoon and confirmed that all occupants had suffered fatal injuries

Other Ketchikan air tour pilots who were flying passenger flights on the morning of the accident stated that there were low clouds in the valley in which the accident occurred. Pilots who were assisting with the search and rescue efforts reported that the weather was overcast, the mountain tops were obscured, and the cloud bases were as low as 600-800 ft overcast above ground level (agl) in some of the valleys, including the valley of the accident location.

2.0 Pilot Information

The accident pilot was 64 years old and resided in Cle Elum, Washington. He was hired by Southeast Aviation LLC on May 16, 2015 as a seasonal pilot for summer commercial sightseeing operations in Ketchikan, Alaska. While in Ketchikan, the pilot stayed in an apartment that Southeast Aviation LLC rented from Carlin Air.

A review of the FAA Accident and Incident Data System (AIDS), Enforcement Information System (EIS) and Program Tracking and Reporting Subsystem (PTRS)²³ databases found that on July 9, 2021, the pilot was involved in an accident in N9279Z, a DHC-2-L-20 Beaver owned by Snow Mountain Enterprises LLC (the owner of N1249K which was also operated by Southeast Aviation LLC).²⁴

According to the FAA PTRS records, the accident pilot transported passengers to Coffman Cove, Alaska on July 9, 2021 and was returning to Ketchikan on a Part 91 repositioning flight.²⁵ During his departure from Coffman Cove, he did not taxi out into the channel to clear his takeoff run because he was in a hurry to get back due to there being more flights on the schedule. He did not see a known green 6' 7" 1,500 lb. marine buoy until he was on step.²⁶ He attempted to depart over it but struck the buoy with the prop and front spreader bar causing the airplane to invert into the water and sink. The pilot was uninjured in the accident.

²³ The PTRS is a comprehensive information management and analysis system used in many Flight Standards Service (AFS) job functions. It provides the means for the collection, storage, retrieval, and analysis of data resulting from the many different job functions performed by Aviation Safety Inspectors (ASIs) in the field, the regions, and headquarters. This system provides managers and inspectors with the current data on airmen, air agencies, air operators, and many other facets of the air transportation system. Source: FAA.

²⁴ See NTSB Case #ANC21LA057.

²⁵ Coffman Cove, Alaska is located approximately 63 nautical miles to the northwest of Ketchikan, Alaska.

²⁶ According to FAA-H-8083-23 Seaplane, Skiplane, and Float/Ski Equipped Helicopter Handbook, the Step Position, or "on step" is the attitude of the seaplane when the entire weight of the aircraft is supported by hydrodynamic and aerodynamic lift, as it is during high-speed taxi or just prior to takeoff. This position produces the least amount of water drag. It is also called the planning position.

The FAA's accident investigation for the July 9, 2021 accident was completed and determined *the pilot acted carelessly as he was in a hurry, did not conduct a complete preflight to include all available information concerning his flight to include a review of the channel marker buoys, and hit the buoy.*²⁷ Post-accident Department of Transportation (DOT) alcohol testing (performed by Lifeloc Technologies) and drug testing (performed by Bio-test Review Services) was conducted on July 9, 2021 with negative results.²⁸

A further review of the National Crime Information Center (NCIC) database indicated no criminal convictions. A review of the National Driver Record (NDR) database showed no suspensions or revocations of the pilot's Washington state driver's license.

The investigation was unable to obtain a comprehensive resume on the pilot detailing his employment history. According to FAA Form 8500-8 Application for Airman Medical, the pilot listed Southeast Aviation LLC as his employer as of April 6, 2021, March 11, 2020, February 28, 2018, February 8, 2017, April 6, 2016, and April 2, 2015. On his March 6, 2019, June 14, 2010, and June 23, 2009 applications he listed Northwest Seaplanes as his employer. On April 3, 2014 and April 2, 2013 he listed Seawind Aviation as his employer. On April 17, 2012 and April 25, 2011 he listed Promech Air as his employer. On his June 12, 2008, June 14, 2007, August 2, 2002 and July 24, 2001 applications he listed his occupation as "Construction superintendent" for "March/McDonald." On his June 22, 2006 and September 1, 2004 applications he listed "Construction" as his occupation and was "self-employed." On his August 26, 2003 application he listed "Remodeler" as his occupation and was "self-employed." On his June 26, 2000, June 25, 1999 and June 26, 1998 applications he listed "Pilot" as his occupation for Kenmore Air.

2.1 The Pilot's Certification Record²⁹

Private Pilot – Airplane Single Engine Land certificate issued June 12, 1978.³⁰

Private Pilot – Airplane Single Engine Land and Sea certificate issued June 13, 1978.

Private Pilot – Airplane Single Engine Land and Sea, Instrument Airplane certificate issued October 16, 1979.

Commercial Pilot – Airplane Single Engine Land, Private Privileges Airplane Single Engine Sea, Instrument Airplane certificate issued October 29, 1979.

Commercial Pilot – Airplane Single Engine Land and Sea, Instrument Airplane certificate issued October 30, 1979.

²⁷ According to the FAA, an FAA Form 8020-23 "FAA Accident/Incident Report" was filed for the July 9, 2021 accident. On July 29, 2021, the FAA sent a Letter of Investigation (LOI) certified return receipt to the accident pilot. On August 24, 2021 the FAA received the LOI certified letter back as unclaimed due to the pilot sustaining fatal injuries in a second accident on August 5, 2021 and the July 9, 2021 accident case was closed with no further action.

²⁸ Southeast Aviation LLC Operations Specifications A449 included the company's anti-drug and alcohol misuse program.

²⁹ Source: FAA.

³⁰ The pilot listed his nationality as Canada. According to FAA Form 8710-1, the pilot graduated from the Private Pilot curriculum at Falcon Aviation in Seattle, Washington.

Flight Instructor – Airplane Single Engine certificate issued June 2, 1980.³¹

Reinstated: January 23, 1988; Renewed: November 5, 1989³²

Commercial Pilot – Airplane Single and Multiengine Engine Land, Airplane Single Engine Sea, Instrument Airplane certificate issued October 31, 1985.

Airline Transport Pilot –Multiengine Engine Land, Commercial Privileges Airplane Single Engine Sea certificate issued January 23, 1988.

Airline Transport Pilot –Multiengine Engine Land, Commercial Privileges Airplane Single Engine Land & Sea. Airplane Multiengine Sea certificate issued December 5, 1990.³³

2.2 The Pilot’s Training and Proficiency Checks Completed³⁴

According to Southeast Aviation LLC, the accident pilot completed initial DHC-2 training on May 12, 2015. He completed subsequent recurrent training on May 21, 2016 and June 12, 2017. He completed requalification training on May 8, 2019 and May 12, 2021.

His most recent recurrent ground training occurred on May 12, 2021. He began flying the 2021 season with Southeast Aviation LLC on May 12, 2021 when he took his 14 *CFR* 135.293 and 135.299 check rides with the Director of Operations.³⁵

There is no record of additional training of the pilot following his July 9, 2021 accident. According to the Southeast Aviation LLC Director of Operations, he and the owner and the Chief Pilot for Southeast Aviation LLC had discussions, they spoke with the pilot and former employers, and they had the pilot “take the airplane out and just fly it.” He further said they wanted the pilot to be the one to tell them if he was ready to come back.

2.3 The Pilot’s Certificates and Ratings Held at Time of the Accident

Airline Transport Pilot –Multiengine Engine Land, Commercial Privileges Airplane Single Engine Land & Sea. Airplane Multiengine Sea (certificate issued December 5, 1990).

Medical Certificate - Second Class medical (issued April 6, 2021)

Limitations – Holder shall possess glasses for near/intermediate vision

³¹ According to FAA Form 8710-1, the pilot graduated from the Flight Instructor Certification course at Willard Flying Club at Paine Field in Everett, Washington.

³² The pilot’s certified flight instructor (CFI) Airplane Single Engine certificate expired in November 1991.

³³ The pilot became a citizen of the United States on February 24, 1989.

³⁴ Source: Southeast Aviation LLC.

³⁵ Title 14 *CFR* 135.293(a) required pilots to pass a written or oral test every 12 calendar months covering topics such as regulations, airplane systems, weight and balance, and weather. Title 14 *CFR* 135.293(b) required pilots to pass a competency check every 12 calendar months. Title 14 *CFR* 135.299 required pilots to pass a line check every 12 calendar months that included at least one flight over one route segment, and takeoffs and landings at one or more representative airports. See Attachment 4 - Pilot Training Records.

2.4 The Pilot's Flight Times

The pilot's flight times, according to Southeast Aviation LLC records:

Total pilot flying time ³⁶	15,552 ³⁷
Total Pilot-In-Command (PIC) time	15,300 (est)
Total DHC-2 flying time	8,000 (est)
Total DHC-2 PIC time	8,000 (est)
Total flying time last 24 hours	5.3
Total flying time last 30 days	40.7
Total flying time last 90 days	124.1
Total flying time last 12 months	124.1

2.5 The Pilot's Training

Southeast Aviation LLC had an FAA-approved Part 135 Training Manual (dated May 9, 2019) with an FAA approved revision date of June 11, 2019. There were five basic categories of training applicable to the company's operations. The primary factor which determined the appropriate category of training were the student's previous experience with the company or other Part 135 operator and his/her previous duty positions. The five categories were:

- A. Initial Training – This category of training was for personnel who had no previous experience with Southeast Aviation LLC operations.
- B. Transition Training – This category of training was for personnel who had been previously trained and qualified for a specific duty position and were being assigned to the same position on a different type of aircraft.
- C. Differences Training – This category of training was required for crewmembers who had qualified and served on a particular type of aircraft, when the administrator finds differences training was necessary before a crewmember serves in the same capacity on a particular variation of that aircraft.
- D. Recurrent Training – This category of training was for personnel who had been trained and qualified with Southeast Aviation LLC, who would continue to serve in the same duty position and aircraft type, and who must receive recurring training and/or checking within an appropriate eligibility period to maintain currency.
- E. Requalification Training – This category of training was required for crewmembers previously trained and qualified with Southeast Aviation LLC, but who had become unqualified due to not having met within the required period the recurrent pilot testing

³⁶ Total flight times provided by Southeast Aviation LLC were estimates, and no pilot logbooks were recovered by the investigation. On his FAA Form 8500-8 Application for Airman Medical dated March 25, 2021, the accident pilot listed Southeast Aviation LLC as his employer, 15,428 total flight time, with 0 hours flown in the previous 6 months.

³⁷ According to FAA Medical Application Forms 8500-8 dated April 6, 2021, the pilot listed his total flight time as 15,428 hours with no flight time in the past 6 months. According to Southeast Aviation LLC records, the pilot flew 121.5 hours between May 12, 2021 and August 4, 2021, and flew 2.6 hours on August 5, 2021. See Attachment 5 - Pilot 2021 Season Work Schedule.

requirements of 135.293, the instrument proficiency check requirements of 135.297, or line checks required by 135.299.

According to the Southeast Aviation LLC Training Manual, the Director of Operations was the only authorized company check airman and instructor for each of these five categories (both ground and flight).

2.5.1 Cue-based Weather Training

The FAA does not require cue-based weather training under Part 135.³⁸ According to the FAA, since 2012, all commercial air tour operators in Southeast Alaska have been providing cue-based weather training to their pilots that was developed specifically for their operations as a result of NTSB Safety Recommendation A-08-61, which recommended a cue-based training program that “specifically addresses hazardous aspects of local weather phenomena and in-flight decision-making.”³⁹ Such training programs are based on the premise that exposing pilots to realistic depictions of deteriorating in-flight weather will help calibrate their weather assessment and foster an ability to accurately assess and respond appropriately to cues associated with deteriorating weather.⁴⁰

The Southeast Aviation LLC Training Manual, Section I page 1-8 stated the following, in part:

Cue Based Training:

All Company pilots will receive Cue based training through the use of PC ATD simulator or computerize reference material annually. Cue based training will include training on routes, terrain, and weather conditions to the areas in which our operations are conducted.

³⁸ Cue-based training programs are based on the premise that exposing pilots to realistic depictions of deteriorating in-flight weather will help calibrate their weather assessment and foster an ability to accurately assess and respond appropriately to cues associated with deteriorating weather. Source: Wiggins, M. and O’Hare, D. (2003). Weatherwise: Evaluation of a cue-based training approach for the recognition of deteriorating weather conditions during flight. Human Factors, 45, 337–345.

³⁹ See NTSB Case #ANC07FA068 for the July 24, 2007 DHC-2 accident involving N995WA operated by Taquan Air Service. Safety Recommendation A-08-61 stated: *Develop, in cooperation with Southeast Alaska commercial air tour operators, aviation psychologists, and meteorologists, among others, a cue-based training program for commercial air tour pilots in Southeast Alaska that specifically addresses hazardous aspects of local weather phenomena and in-flight decision-making.* In 2008 and 2009, the FAA indicated that it was collaborating with various organizations to develop a voluntary cue-based training program, and on January 4, 2012, the FAA informed the NTSB that all commercial air tour operators in Southeast Alaska were providing this training to their pilots. As a result, on March 28, 2012, the NTSB classified Safety Recommendation A-08-61 “Closed—Acceptable Action.” Safety Recommendation A-08-62 stated: *Once a cue-based training program that specifically addresses hazardous aspects of local weather phenomena and weather-related, decision-making issues is developed as requested in Safety Recommendation A-08-61, require all commercial air tour operators in Southeast Alaska to provide initial and recurrent training in these subjects to their pilots.* On April 3, 2012, the FAA responded that, as of the 2011 Alaska (summer) air tour season, all air tour operators in Southeast Alaska had incorporated the training into their programs. As a result of the FAA’s action and assurances of continued monitoring of tour operator compliance with the training through regular surveillance, on June 14, 2012, the NTSB classified Safety Recommendation A-08-62 Closed—Acceptable Alternate Action.

⁴⁰ Source: Wiggins, M. and O’Hare, D. (2003) Weatherwise: Evaluation of a cue-based training approach for the recognition of deteriorating weather conditions during flight. Human Factors, 45, 337–345.

The Basic Indoctrination and Recurrent course curriculums outlined in the Southeast Aviation LLC Training Manual contained a module for “Hazardous meteorological conditions” that included the following training element:⁴¹

Cue Based training in hazardous weather and terrain (PC ATD or Computer based)

According to the Southeast LLC Director of Operations, pilots used to receive cue-based training through the means of a compact disk (CD) and computer. He further stated that the CD had been lost for a while, they did not use the computer for training, and the simulator (ATD training device) was “in parts over at the airport.”⁴² A review of the accident pilot’s Southeast LLC training records showed that on May 12, 2021, the Director of Operations and accident pilot signed a recurrent training certificate that included “cue-based evaluation.”⁴³

FAA Advisory Circular (AC) 61-98D “Currency Requirements and Guidance for the Flight Review and Instrument Proficiency Check” (dated April 30, 2018) stated the following in part:

Another area where pilots have experienced LOC [loss of control] is while maneuvering in IMC [instrument meteorological conditions]. Vertigo or spatial disorientation has been a significant factor in many aircraft accidents. The common result when a noninstrument-rated pilot inadvertently continues flight into IMC is spatial disorientation of the pilot and LOC. Pilots who are instrument rated, but not instrument proficient, are also susceptible. Recovery from LOC in IMC can be nearly impossible without skills and competency. Additionally, instrument-rated pilots maneuvering in IMC who fail to prioritize pilot workload properly and use Crew Resource Management (CRM) or Single Pilot Resource Management (SRM) may become inattentive or distracted and lose situational awareness (SA), which too often can lead to LOC. The GAJSC [General Aviation Joint Steering Committee] determined that pilots and flight instructors need to emphasize effective preflight planning and pilot proficiency to reduce the risk of LOC in IMC.

For inadvertent instrument meteorological conditions (IIMC), the Director of Operations stated that he trained the pilot to turn 180 degrees and then make a possible descent. To simulate instrument conditions and restrict outside vision during the recovery, he would have the pilot pull down his baseball hat and look only at the instrument panel.⁴⁴

⁴¹ The Requalification course listed in the Southeast Aviation LLC Training Manual did not have a module for cue-based training.

⁴² See Attachment 1 – Interview Transcripts. According to the Southeast Aviation LLC Training Manual, the following were listed as “training aids” to be used in pilot training: VCR and Monitor, Training Tapes, View Limiting Devices, Computers and Plotters, Blackboard (White board).

⁴³ See Attachment 4 – Pilot Training Records.

⁴⁴ Following the July 24, 2007 impact with mountainous terrain about 40 miles northeast of Ketchikan of a DHC-2 airplane operated by Taquan Air Service, the NTSB issued Safety Recommendations A-08-59 thru -62. Safety Recommendation A-08-62 stated: *Once a cue-based training program that specifically addresses hazardous aspects of local weather phenomena and weather-related, decision-making issues is developed as requested in Safety Recommendation A-08-61, require all commercial air tour operators in Southeast Alaska to provide initial and recurrent training in these subjects to their pilots.* The recommendation was classified Closed-Acceptable Alternate as of June 14, 2012 when the FAA responded that as of the 2011 Alaska air tour season, all air tour operators in Southeast Alaska added materials and concepts developed as part of the cue-based training project to their training programs. These include, but are not limited to, training videos, use of basic airplane training devices with wide screen

On May 12, 2021, the Director of Operations completed an FAA Form 8410-3 for the pilot's 14 *CFR* 135.293 and 135.299 checks. The form included hand-written notes that stated "Basic Inst, Partial Panel, Unusual ATT, IIMC Rec." Each was graded satisfactory.

2.6 The Pilot's Schedule

The pilot lived in Cle Elum, Washington when not operating flights for Southeast Aviation LLC during the summer months. According to Southeast Aviation LLC records, the pilot's assigned duty time was typically 0600 to 2000 each day he was on duty.⁴⁵

Between May 12, 2021 and July 9, 2021, the pilot flew 98.8 hours. Between July 10, 2021 and July 29, 2021 the pilot was off duty following the July 9, 2021 accident. He resumed flying on July 30, 2021 and had flown 22.7 hours prior to the day of the accident on August 5, 2021.

On July 30, 2021 he began his duty day at 0700 and completed duty at 1900 with 5.2 hours flown. On July 31, 2021 he began his duty day at 0600 and completed duty at 1900 with 6.0 hours flown. On August 1, 2021 he began his duty day at 0645 and completed duty at 1800 with 5.3 hours flown. On August 2, 2021 the pilot began his duty day at 0800 and completed duty at 1500 with 1.0 hours flown. On August 3, 2021 the pilot began his duty day at 0515 and completed duty at 1300 with 2.5 hours flown.

On August 4, 2021 (the day before the accident) the pilot began his duty day at 0730 and completed duty at 1700 with 2.7 hours flown. The pilot was scheduled to begin his assigned duty day at 0600 on August 5, 2021, providing 13 hours of scheduled rest opportunity.⁴⁶

3.0 Medical and Pathological Information

According to the FAA, the pilot was a 64-year-old male and reported civil flight experience that included 15,428 total and 0 hours in last six months as of most recent medical exam dated April 6, 2021. The exam was conducted by an Aviation Medical Examiner (AME). The pilot was issued a Second Class Medical Certificate with the following limitation: "Holder shall possess glasses for near / intermediate vision."

outside view and photo-realistic instrument panels for each type of tour airplane. These devices include programmable visibility restrictions and deterioration rates, visibility targets, and photo-realistic terrain. Ketchikan, Alaska-based air tour operators' cue-based training programs were approved and implemented prior to the 2010 air tour season. Further, Recommendation A-08-61 was Closed Acceptable Alternate on March 28, 2012 when the FAA responded that, in cooperation with local operators in Alaska and the Medallion Foundation, it had developed a cue-based weather-training program. Founded in 2001, the Medallion Foundation was a non-profit Alaskan safety organization established by the Alaska Air Carriers Association (AACA), a state industry group, to "improve pilot safety awareness" and "reduce air carrier insurance rates." In 2002, Medallion received an initial \$3 million FAA grant that would be followed by \$19.5 million more from the agency over the next 17 years. Following a series of accidents in Alaska involving operators that had been part of the program, Medallion closed on September 15, 2019.

⁴⁵ See Attachment 5 - Pilot 2021 Season Work Schedule.

⁴⁶ Title 14 *CFR* 135.267(d) stated the following: *Each assignment under paragraph (b) of this section must provide for at least 10 consecutive hours of rest during the 24-hour period that precedes the planned completion time of the assignment.*

The pilot reported that he took no medications (questions 17a) on his most recent FAA Form 8500-8 Application for Airman Medical. The pilot reported his occupation as “Seaplane Pilot – Southeast Aviation.” No concerns were reported by the pilot and no significant issues were identified by the AME.

There were 40 prior exams from a 1977 Third Class exam through a 2020 Second Class exam. The pilot reported a back strain in 2003. FAA medical records indicated that his corrected distant, intermediate and near vision was 20/20. No significant issues were identified by previous AMEs.

Biological specimens from the pilot’s body were forwarded to the FAA’s Civil Aerospace Medical Institute (CAMI) in Oklahoma City, Oklahoma for toxicological testing, and tested negative for carbon monoxide, ethanol, glucose and a range of legal and illegal drugs.

A postmortem examination of the pilot was conducted under the authority of the State of Alaska Medical Examiner, Anchorage, Alaska. The cause of death for the pilot was “multiple blunt-force injuries.”⁴⁷

4.0 Airplane Information



Photo 10: Photo of N1249K taken prior to departure on the accident flight, August 5, 2021.⁴⁸

The accident airplane was a De Havilland DHC-2 MK.1 (Beaver), serial number 1594, registration N1249K. It was a fixed-wing, single-engine airplane, equipped with floats, and was manufactured

⁴⁷ See Medical and Pathological Information - Memorandum for Record in the Docket for this investigation.

⁴⁸ Photo was taken on August 5, 2021 with an iPhone 8 plus recovered at the accident site.

in 1965.⁴⁹ It was powered by a Pratt and Whitney R-985-AN-14B radial engine. Its FAA certificate was issued on June 10, 2015.⁵⁰

The airplane was registered to Snow Mountain Enterprises LLC of Ketchikan, Alaska, and the registered agent was the Southeast Aviation LLC owner's spouse. It was operated by Southeast Aviation LLC as a 14 *CFR* Part 135 commercial air tour. According to a "white board" located at the Southeast Aviation LLC office, N1249K had an annual inspection due "7/22," a 100-hour inspection due at 2,086.0 tachometer hours, and the current tachometer reading was shown as 2,035.6 hours.⁵¹

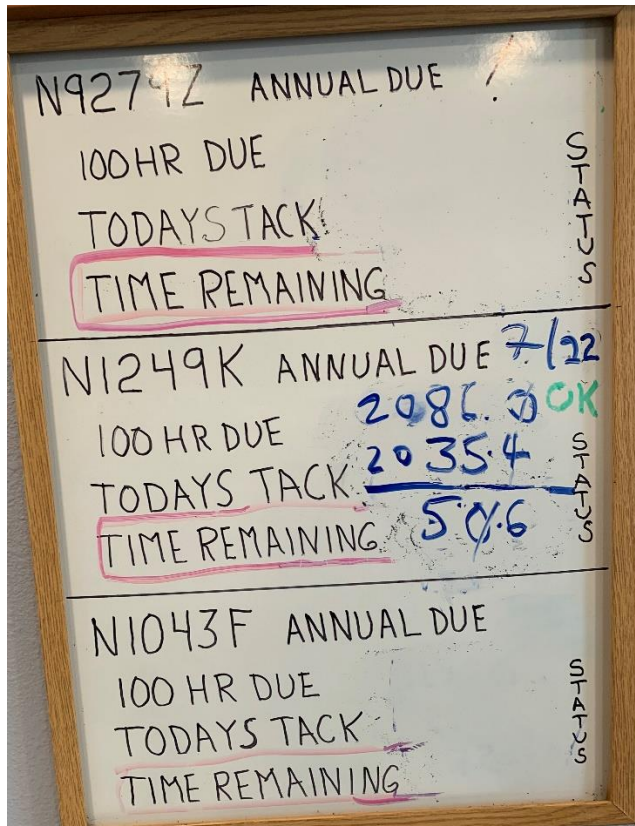


Photo 11: Aircraft information board at Southeast Aviation offices.⁵²

According to FAA records, the FAA registration for N1249K expired on June 30, 2021.⁵³ According to the Southeast Aviation LLC owner, it was his responsibility to ensure the airplane's

⁴⁹ The DHC-2 was certified for one pilot.

⁵⁰ Source: FAA.

⁵¹ The Southeast Aviation LLC GOM stated the following: *The aircraft maintenance schedules will be kept up on a daily basis and it includes all time life items for a specific aircraft. The schedule will be kept in the aircraft as well as the main Southeast Aviation LLC office. This schedule will be placed in the aircraft after each 100hr inspection and will also be available to the pilot. The Maintenance Schedule will be located in the front of the aircraft operations manual for quick reference.*

⁵² Source: NTSB Ops Group Chairman.

⁵³ See Attachment 6 - N1249K FAA Registration Information.

registration was current, and he did not realize that the registration had expired until the NTSB notified him following the accident.⁵⁴

4.1 DHC-2 Cockpit Layout



Photo 12: Exemplar DHC-2 cockpit panel (N9279Z) operated by Southeast Aviation and involved in a July 9, 2021 accident, flown by the accident pilot.⁵⁵

⁵⁴ See Attachment 1 – Interview Transcripts.

⁵⁵ Source: Email sent to the NTSB from Alaska Claims Services on August 7, 2021 at 1838.

4.2 Airplane Dimensions

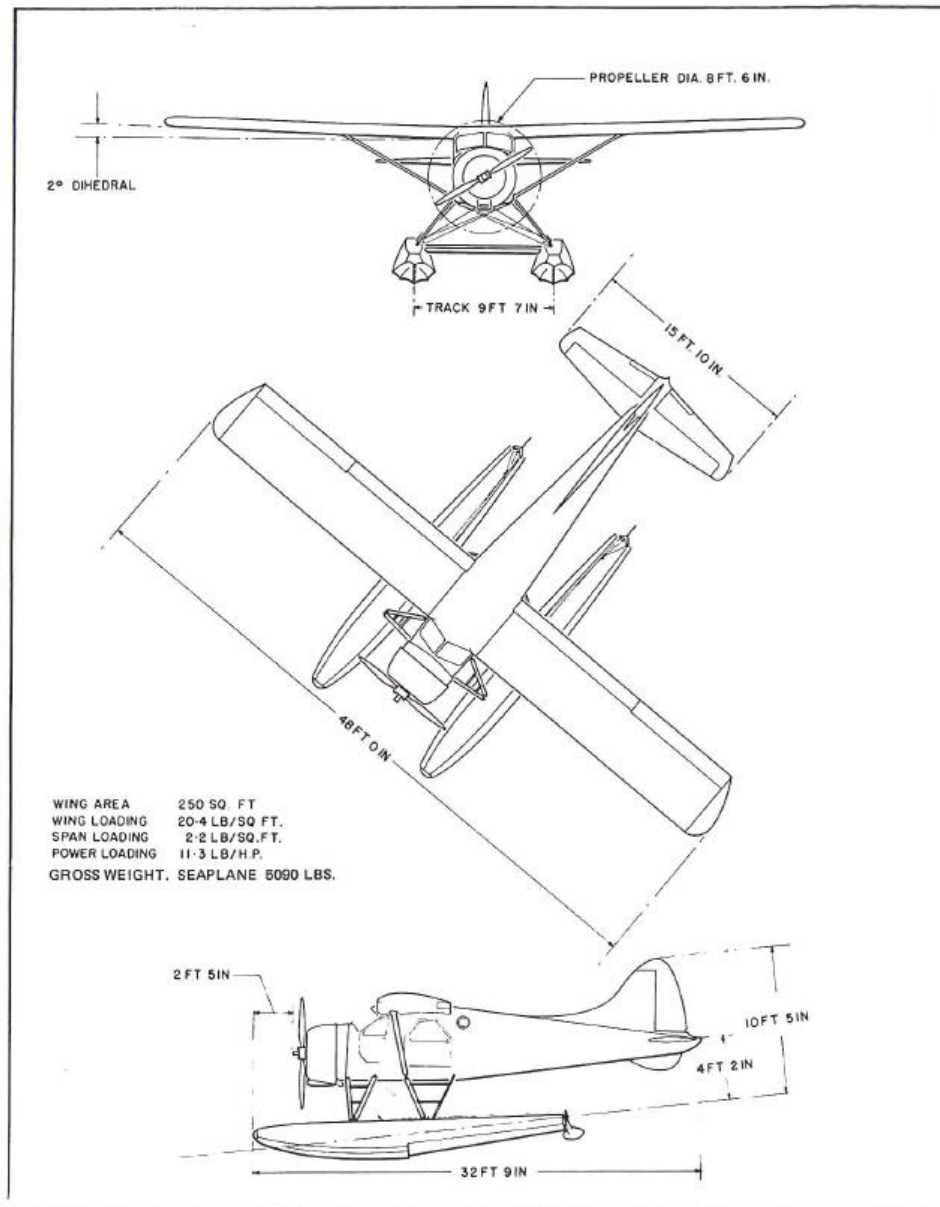


FIG 1-2 THREE VIEW DIMENSIONAL DIAGRAM - SEAPLANE

Figure 7: DHC-2 MK.1 Beaver airplane dimensions (seaplane configuration).⁵⁶

4.3 DHC-2 MK.1 Airplane Performance⁵⁷

4.3.1 General

The DHC-2 MK.1 Airplane Flight Manual (AFM), Section 4.11.1, page 42 stated the following, in part:

⁵⁶ Source: DHC-2 Beaver AFM.

⁵⁷ See also Attachment 8 - N1249K Airplane Flight Manual Excerpts.

Stability is good about all axes. The aircraft is easy to fly and is docile down to the stall. Controls are normally effective throughout the airspeed range. The aircraft can be trimmed to fly hands-off from climb to maximum speeds.

According to the AFM, Section 4, the sea level rate of climb at maximum power (seaplane configuration at 5,090 pounds) was 740 feet per minute (fpm), and 685 fpm at 5,000 feet.

The maximum indicated airspeed (seaplane configuration) was 105 knots with “flaps,” 180 knots diving, and 145 knots cruising. The flaps “landing” distance to clear a 50-foot obstacle in still air was 1,510 feet. The service ceiling in the seaplane configuration was 15,750 feet.

4.3.2 Stall Characteristics

The DHC-2 MK.1 AFM, Section 4.11.5, page 42 stated the following, in part:

The stall is gentle at all normal conditions of load and flap and may be anticipated by a slight vibration, which increases as flap (sic) is lowered. The aircraft will pitch if no yaw is present. If yaw is permitted, the aircraft has a tendency to roll. Prompt corrective action must be initiated to prevent roll from developing.

The stall speed (seaplane configuration) was 60 knots flaps up, and 45 knots flaps “landing.”

4.3.3 Load Factors

The DHC-2 MK.1 AFM, Section 4.6.1 page 36 stated the following, in part:

In tight turns, flight load factors may reach the limit loads, and may also increase the danger of an unintentional stall.

The variation of flaps up stalling speed and load factors with angle of bank are given below:

<u>Angle of Bank</u>	<u>Stalling Speed</u> <u>mph IAS</u>	<u>Load Factor</u>
0°	60	1.0
50°	85	1.5
60°	105	2.0
65°	115	2.5
70°	130	3.0

Figure 8: Variation of flaps up stalling speed and load factors with angle of bank chart.

4.4 Weight and Balance

Title 14 *CFR* 91.103 Preflight Action stated in part that each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight.

Title 14 *CFR* Part 91.9 covers general operating and flight rules for all aircraft, and stated the following in part:

(b) Except as provided in paragraph (d) of this section, no person may operate a civil aircraft without complying with the operating limitations specified in the approved Airplane or Rotorcraft Flight Manual, markings, and placards, or as otherwise prescribed by the certificating authority of the country of registry.

Southeast Aviation LLC's approved weight and balance program for its Part 135 operations was defined in Operation Specifications A096, and stated in part:

The certificate holder is authorized to use only actual weights when determining the aircraft weight and balance. This includes:

- (1) Actual weights of all passengers and bags (including carry-on, checked, plane-side loaded, and heavy bag weights) and cargo, or*
- (2) Solicited ("asked") passenger weight plus 10 pounds and the actual weight of bags and cargo.*

According to the Southeast Aviation LLC General Operations Manual (GOM), the PIC must determine that the aircraft is within proper weight and balance limitations prior to flight. These calculations must include actual weights for passengers, carry-on baggage, and cargo. Actual passenger weights can be determined on of two ways:

1. Weigh each passenger on a scale.
2. Ask each passenger their weight and add 10 pounds.

In the event the PIC determined an obvious discrepancy in the passenger's weight given, it became necessary to weigh that passenger.

To determine the Center of Gravity (CG), the PIC shall use the aircraft Weight and Balance records, a weight and balance calculator or an estimate based on their experience. If in doubt or near limits, the PIC will not use an estimate.

The investigation was not provided with documentation that a weight and balance (including CG) was computed for the accident flight. The following table is an estimate of the weight (in pounds) of the accident flight, based on available information.

WEIGHT & BALANCE⁵⁸ (maximum certificated weights in bold) (weight in pounds)	
Basic Empty Weight ⁵⁹	3,377.38
Pilot Weight ⁶⁰	230
Passenger Weights ⁶¹	978

⁵⁸ Due to insufficient evidence, an accurate center of gravity could not be determined for the accident flight.

⁵⁹ According to the Pilot's Handbook of aeronautical Knowledge (FAA-H-8083-25), page 7-1, the basic empty weight was the weight of the standard airplane, optional equipment, unusable fuel, and full operating fluids including full engine oil.

⁶⁰ Pilot weight derived from the accident pilot's FAA Form 8500-8 Application for Airman Medical, dated April 6, 2021.

⁶¹ Passenger weights were obtained from the manifest provided by Southeast Aviation LLC.

Zero Fuel Weight	4,585.38
Maximum Zero Fuel Weight	n/a
Fuel Weight ⁶²	330
Takeoff Weight (estimated)	4,915.38
Maximum Takeoff Weight	5,090

Table 1: Weight and balance chart.

5.0 Meteorological Information

See Meteorology Group Chairman's Factual Report in the Docket for this accident.

5.1 Southeast Aviation LLC Approved Weather Sources

Southeast Aviation LLC Operations Specifications A010 stated the following, in part:

The certificate holder conducting 14 CFR Part 135 operations is authorized to use weather reporting facilities operated by the National Weather Service (NWS), a source approved by the NWS, or a source approved by the Administrator.

According to the Southeast Aviation LLC GOM, the company was authorized to use only those weather reports and forecasts in VFR operations that were prepared by the NWS or source approved by the NWS, or other source approved by the FAA.

According to the Southeast Aviation LLC GOM, sources approved by the NWS included the following:

1. NWS Field Facilities
2. FSS
3. Supplemental Aviation Weather Reporting Stations (SWARS)
4. Limited Aviation Weather Reporting Stations (LAWRS)
5. Automated Surface Observations
6. Company trained weather observers

According to the Southeast Aviation LLC GOM, sources approved by the FAA included the following:

1. Any meteorological office operated by a foreign state that subscribes to International Civil Aviation Organization (ICAO) standards and practices
2. Any U.S. Military weather reporting source.

5.2 Minimum Visibility and Altitude Requirements.

According to the Southeast Aviation LLC Director of Operations, the company did not have more conservative defined weather minimums than those prescribed in Part 135.⁶³

⁶² Southeast Aviation LLC provided fuel estimate based on typical Misty Fjord flights. Confirmation of actual fuel uplift was provided by the Carlin Air fueler. See Attachment 1 – Interview Transcripts.

⁶³ As a result of the June 25, 2015, accident in which a Pro-Mech de Havilland DHC-3 (Otter) airplane collided with

Title 14 *CFR* 135.205 VFR: Visibility requirements stated the following, in part:

(a) No person may operate an airplane under VFR in uncontrolled airspace when the ceiling is less than 1,000 feet unless flight visibility is at least 2 miles.

Title 14 *CFR* 135.203 VFR: Minimum altitudes stated the following, in part:

Except when necessary for takeoff and landing, no person may operate under VFR—

(a) An airplane—

(1) During the day, below 500 feet above the surface or less than 500 feet horizontally from any obstacle; or

(2) At night, at an altitude less than 1,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown or, in designated mountainous terrain, less than 2,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown.

The Southeast Aviation LLC GOM stated the following, in part:

During al (sic) VFR flight each pilot is responsible for seeing and avoiding other traffic, terrain and obstacles.

Title 14 *CFR* 91.3 Responsibility and authority of the pilot in command, stated the following in part:

The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

Title 14 *CFR* 91.103 Preflight action, stated the following in part:

Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight.

mountainous, tree-covered terrain about 24 miles east-northeast of Ketchikan, Alaska, the NTSB issued Safety Recommendations A-17-35 to -43. Safety Recommendation A-17-37 to the FAA stated: *Work with members of the Ketchikan air tour industry to improve existing training programs aimed at reducing the risk of weather-related accidents involving continuation of flight under visual flight rules into instrument meteorological conditions, with special attention paid to the human factors issues identified in this investigation, including (1) the need to help pilots better calibrate what constitutes safe weather conditions to conduct flights based on objective standards and requirements, such as set criteria for what landmarks must be clearly visible from which locations in order to proceed on a particular route; (2) the need to help pilots who are new to the area recognize dynamic local weather patterns that can place them in a dangerous situation; and (3) operational influences on pilot decision-making.* Safety Recommendation A-17-43 stated: *Develop and implement special operating rules for the Ketchikan air tour industry that include en route visual flight rules weather minimums that are tailored to the industry's unique requirements and are more conservative than those specified in 14 Code of Federal Regulations Part 135.* Both Recommendations are currently classified Open-Unacceptable Response.

6.0 Aids to Navigation

6.1 Ketchikan VFR Sectional Chart

According to the FAA, Sectional Aeronautical Charts are the primary navigational reference medium used by the VFR pilot community. The 1:500,000 scale Sectional Aeronautical Chart Series is designed for visual navigation of slow to medium speed aircraft. The topographic information featured consists of the relief and a judicious selection of visual checkpoints used for flight under visual flight rules. The checkpoints include populated places, drainage patterns, roads, railroads, and other distinctive landmarks.⁶⁴

The aeronautical information on Sectional Charts includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data. These charts are updated every six months, however most Alaska Charts are updated annually.⁶⁵

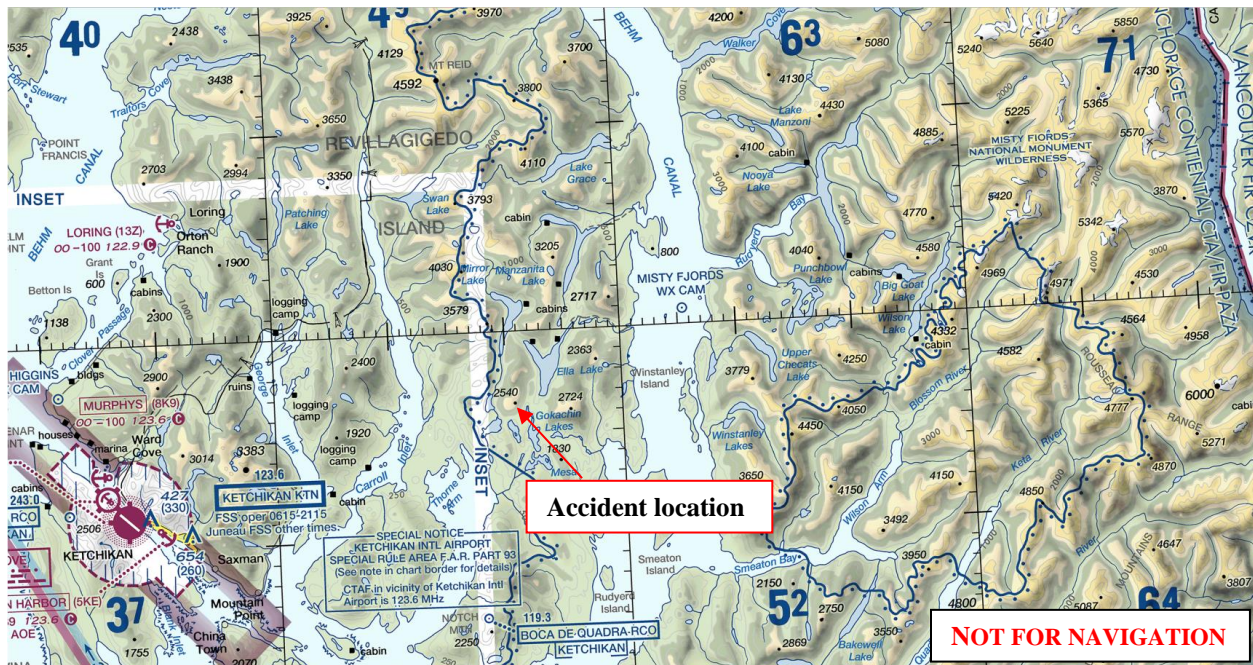


Figure 9: Enlargement of VFR Sectional Chart covering KTN and the Misty Fjords National Monument area (dated October 7, 2021).⁶⁶

⁶⁴ Source: https://www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/vfrcharts/sectional/.

⁶⁵ Source: https://www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/vfrcharts/sectional/.

⁶⁶ Source: <https://aeronav.faa.gov/visual/10-07-2021/PDFs/Ketchikan.pdf>. See Attachment 11 - Ketchikan Sectional Chart.

7.0 Airport Information

7.1 Ketchikan Harbor Seaplane Base (5KE)⁶⁷

The accident airplane departed and was subsequently returning to 5KE, which was at a latitude/longitude of 55-20-40.0700N / -131-39-48.3800W, and at an estimated field elevation of 0 feet.

The seaplane base was for public use and was the base of operations for Southeast Aviation LLC.

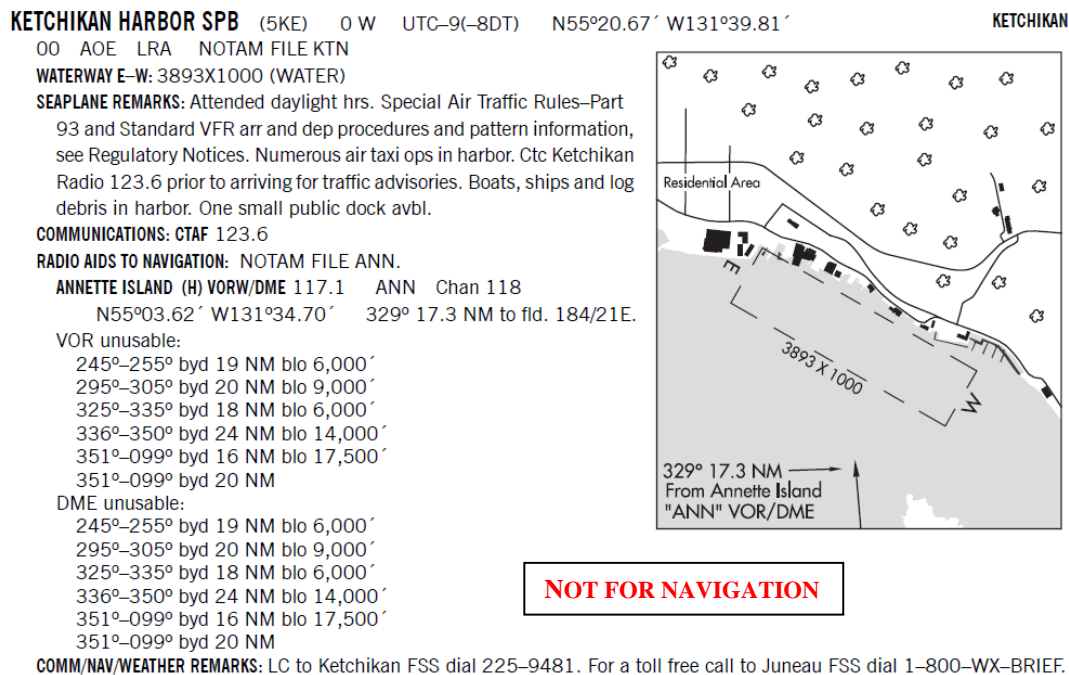


Figure 10: FAA Airport Facilities Directory information for the Ketchikan Harbor Seaplane Base.

7.2 Ketchikan International Airport

The closest airport to the accident flight's departure and intended return (5KE) was KTN located about two nautical miles to the west of 5KE at 55.3540833N and -131.7112222W. KTN had an elevation of 92.4 feet above mean sea level (msl). The airport was uncontrolled (had no operating ATC tower).

The airport had a single asphalt/grooved runway surface, designated runways 11/29, and was 7,500 feet long and 150 feet wide.⁶⁸

7.2.1 KTN FSS

KTN was manned by FSS personnel. According to the FAA Aeronautical Information Manual (AIM) dated June 17, 2021, FSSs are air traffic facilities that provide pilot briefings, flight plan

⁶⁷ According to the FAA Alaska Aviation Safety Initiative Interim Reports (April 23, 2021), as of December 2020, Alaska has 396 public use airports (284 land based, 4 heliports, and 108 seaplane bases).

⁶⁸ For additional charted information on KTN, see Attachment 9 – KTN Charts.

processing, en route flight advisories, search and rescue services, and assistance to lost aircraft and aircraft in emergency situations. FSSs also relay ATC clearances, process Notices to Airmen, and broadcast aviation weather and aeronautical information. In Alaska, designated FSSs also take weather observations, and provide Airport Advisory Services (AAS).⁶⁹

According to the AIM, FSS's are the primary source for obtaining preflight briefings and inflight weather information. Flight Service Specialists are qualified and certificated by the NWS as Pilot Weather Briefers. They are not authorized to make original forecasts but are authorized to translate and interpret available forecasts and reports directly into terms describing the weather conditions which you can expect along your flight route and at your destination.

Available aviation weather reports, forecasts and aviation weather charts are displayed at each AFSS/FSS, for pilot use. Pilots should feel free to use these self-briefing displays where available, or to ask for a briefing or assistance from the specialist on duty. Three basic types of preflight briefings are available to serve specific needs. These are:

Standard Briefing, Abbreviated Briefing, and Outlook Briefing.

Pilots should specify to the briefer the type of briefing they want, along with their appropriate background information to enable the briefer to tailor the information to the intended flight.⁷⁰

According to the Southeast Aviation LLC Director of Operations, the accident pilot would call FSS to get a weather briefing. According to an ATC interview with a KTN FSS controller, it was his experience that the accident pilot had never called KTN FSS for any weather briefing.⁷¹

8.0 Communications

Ketchikan International Airport had special communications requirements outlined in Title 14 *CFR* Part 93 Subpart M - Ketchikan International Airport Traffic Rule.⁷²

According to the FAA, special air traffic rules and communication requirements were in effect for a pilot operating an aircraft under VFR to, from, or in the vicinity of the Ketchikan International Airport or Ketchikan Harbor. These procedures were in effect below 3,000 feet MSL with the perimeter defined as the Ketchikan Class E surface area regardless of whether the Class E surface area is in effect.

When the Ketchikan FSS was in operation, no person may operate an aircraft within the airspace specified above, or taxi onto the runway at KTN, unless that person had established two-way radio communications with the Ketchikan FSS for the purpose of receiving traffic advisories. Pilots should continue to monitor the advisory frequency at all times while operating within the specified

⁶⁹ For additional information on the FSS located at KTN, see Air Traffic Control Group Chairman's Factual Report.

⁷⁰ On October 7, 2021, the FAA provided the NTSB with historical data for the total number of IFR/VFR flight plans filed by pilots with the KTN FSS. To view the various charts of this data created by the investigation, see Attachment 15 - KTN Filed Flight Plan Data Charts.

⁷¹ See Air Traffic Control Group Chairman's Factual Report in the Docket for this accident.

⁷² See Attachment 10 – KTN Part 93.

airspace. When the Ketchikan FSS was not in operation each pilot must continuously monitor and communicate, as appropriate, on the designated common traffic advisory frequency (CTAF) as follows:

- **For inbound flights:** Announce position and intentions when no less than 10 miles from KTN. Monitor the designated frequency until clear of the movement area on the airport or Ketchikan Harbor.
- **For departing flights:** Announce position and intentions prior to taxiing onto the active runway on the airport or onto the movement area of Ketchikan Harbor. Monitor the designated frequency until outside the airspace described above. Announce position and intentions upon departing that airspace.

Aircraft normally arrived and departed the Ketchikan Class E airspace via the Tongass Narrows. This resulted in aircraft passing very close in an area with very little maneuvering room. In response to the higher-than-normal risks and to ensure an acceptable margin of aviation safety, special VFR arrival and departure procedures/patterns for floatplanes, helicopters, and single-engine wheeled aircraft were in use for all VFR operations in the Ketchikan and Tongass narrows area.⁷³

9.0 Company Information

Southeast Aviation LLC was a 14 *CFR* Part 135 air carrier (certificate #S03A006I) that held an on-demand certificate for common carriage pursuant to Title 14 *CFR* 119.21(a)(5). The company was authorized per Operations Specifications A003 to use the DHC-2-MK1 airplane (single-engine sea) for passenger and cargo operations in day VFR only. The company headquarters was located in Ketchikan, Alaska. The owner, Director of Operations, Chief Pilot and Director of Maintenance all resided in Ketchikan, Alaska.

Prior to the accident, the company operated one DHC-2 MK.1 Beaver (the accident airplane), and had a total of six employees, and four seasonal pilots.⁷⁴ All pilots for Southeast Aviation LLC were based at 5KE. According to the Dunn and Bradstreet website Southeast Aviation LLC was part of the Travel Arrangement and Reservation Services Industry.⁷⁵

Southeast Aviation LLC did not have, nor was it required to have, a Safety Management System (SMS) and did not conduct any formal risk assessment prior to an air tour flight.⁷⁶ The accident airplane did not have, nor was it required to have, a Flight Data Monitor (FDM) installed, and

⁷³ For additional information, see Attachment 11 – Ketchikan SFAR Charts.

⁷⁴ According to the Southeast Aviation LLC Operations Specifications D085, the company had two airplanes (N1249K and N9279Z). However, N9279Z was the airplane involved in the July 9, 2021 accident flown by the accident pilot.

⁷⁵ Source: <https://www.dnb.com/business-directory/company-profiles.southeast-aviation-llc>.

⁷⁶ As a result of the fatal accident involving British Aerospace HS 125-700A in Akron, Ohio on November 10, 2015 (Accident Report NTSB/AAR-16/03), the NTSB issued Safety Recommendations A-16-34 through -46. Safety Recommendation A-16-36 to the FAA stated: *Require all 14 Code of Federal Regulations Part 135 operators to establish safety management system programs.* Following the midair collision over George Inlet of a DHC-2 and DHC-3 in Ketchikan, Alaska on May 13, 2019 (NTSB Accident Report NTSB/AAR-21/04), the NTSB reiterated Safety Recommendation A-16-36. The Recommendation status is currently Open - Unacceptable Response.

Southeast Aviation LLC was not required to have an FDM program to monitor the operations of its flights.⁷⁷

The Southeast Aviation LLC GOM's "Company Policy and Procedures Instructions" stated the following, in part:

All company flight operations shall be conducted in a professional and disciplined manner in the highest tradition of the air transportation industry. Safety of the aircraft and passenger comfort shall be considered of overriding and primary importance.

All applicable rules, regulations, procedures and policies will be carefully followed unless emergency considerations or very sound judgment recommends deviation. When confronted with a matter of choice or interpretation in determining a course of action where the decisions are a matter of judgment, the safer alternative will always be chosen.

Economic or service considerations cannot be allowed to compromise safety. However, this policy should not be interpreted as an invitation to disregard cost. If the Company is to succeed, all personnel must continually seek the most efficient and economical means of operation; however, it is to be interpreted as firm and standing instruction to the effect that safety and compliance with all safety regulations will always, without exception, take precedence over economic and all other considerations.

The policies and procedures contained herein provide basic operational philosophies and include general procedures and regulations applicable to all Company pilots. For more specific information on aircraft operating procedures, refer to the appropriate AFM.

9.1 Southeast Aviation LLC Management Personnel

Title 14 *CFR* 119.69 listed the management personnel required for operations under Part 135, and stated the following, in part:

(a) Each certificate holder must have sufficient qualified management and technical personnel to ensure the safety of its operations. Except for a certificate holder using only one pilot in its operations, the certificate holder must have qualified personnel serving in the following or equivalent positions:

- (1) Director of Operations.*
- (2) Chief Pilot.*
- (3) Director of Maintenance.*

⁷⁷ As a result of the fatal accident involving British Aerospace HS 125-700A in Akron, Ohio on November 10, 2015 (Accident Report NTSB/AAR-16/03), the NTSB issued Safety Recommendations A-16-34 through -46. Safety recommendation A-16-34 to the FAA stated: *Require all 14 Code of Federal Regulations Part 135 operators to install flight data recording devices capable of supporting a flight data monitoring program.* Safety Recommendation A-16-35 to the FAA stated: *After the action in Safety Recommendation A-16-34 is completed, require all 14 Code of Federal Regulations Part 135 operators to establish a structured flight data monitoring program that reviews all available data sources to identify deviations from established norms and procedures and other potential safety issues.* Both Recommendations are classified Open - Unacceptable Response.

The Southeast Aviation LLC Operations Specifications A006 listed the the Director of Maintenance, Director of Operations and the Chief Pilot as authorized management positions and personnel.

9.2 Personnel Duties

9.2.1 Director of Operations

The Southeast Aviation LLC GOM listed the following responsibilities for the Director of Operations:

1. Reports to the General Manager (company owner).
2. Supervises the Chief Pilot and other employees as directed by the General Manager (company owner).
3. Ensures that all flight operations are conducted safely and in compliance with all Federal Aviation Regulations, Operations Specifications, and Company policies.
4. Has the authority for the Certificate holder, including signing FAA correspondence and operations specifications.
5. Communicates with the FAA Flight Standards District Office and the National Transportation Safety Board. Files all required reports and documents.
6. Devises revisions to the GOM as needed, submits the proposed revisions to the FSDO, receives confirmation from the FSDO that the revisions are acceptable, and then distributes those revisions to all manual holders.
7. Schedules aircraft availability, including scheduling the aircraft for required inspections.
8. Coordinates with the Director of Maintenance the timely correction of mechanical irregularities and discrepancies.
9. Hires and fires flight personnel.

9.2.2 Chief Pilot

The Southeast Aviation LLC GOM listed the following responsibilities for the Chief Pilot:

1. Reports to the Director of Operations.
2. Supervises flight personnel.
3. Conducts or supervises all training activities of flight crew personnel.
4. Advises the Director of Operations regarding the training of flight crew personnel.
5. Assists the Director of Operations in formulating operations policies, coordinates those policies, and coordinates operations and training.
6. Ensures that all aircraft are properly equipped for applicable operations.
7. Disseminates information to all crewmembers pertaining to routes, airports, NOTAMs, NAVAIDS, company policies, and regulations.
8. Maintains proficiency as Pilot-in-Command.
9. Schedules flight crewmembers, including assigning Pilot-in-Command duties.
10. Prepares and maintains proficiency records, pilot files, flight schedules, duty time records, reports, and correspondence pertaining to flight operations activities.
11. Submits all reports regarding flight personnel to the Director of Operations.
12. Keeps the aircraft copies of the Operations Manual current.

13. Ensures that all flight crew personnel are certified and supervised according to the requirements specified in the Federal Aviation Regulations.

9.2.3 Director of Maintenance

The Southeast Aviation LLC GOM listed the following responsibilities for the Director of Maintenance:

1. Reports to the Director of Operations.
2. Is responsible for all maintenance and inspection personnel and signing of Part D of the Operations Specifications.
3. Ensures that company aircraft are maintained in an airworthy condition.
4. Ensures that all inspections, repairs, and component changes are accomplished in accordance with manufactures or FAA approved procedures.
5. Ensures compliance with maintenance procedures, airworthiness directives, service bulletins, service letters, and applicable Federal Aviation Regulations.
6. Ensures all maintenance technicians are trained and current on the types of aircraft for which approved.
7. Ensures that all maintenance technicians are certified and supervised according to the requirements specified in the Federal Aviation Regulations.
8. Coordinates with maintenance contracting agencies when maintenance activities are being performed on company aircraft.
9. Provides the Director of Operations with the current airworthiness status of the aircraft and the forecast down times to facilitate maintenance scheduling and insure timely deferral or correction of aircraft discrepancies.
10. Maintains a close liaison with manufacturer's representatives, parts supply houses, repair facilities and the FAA.
11. Makes available to maintenance personnel the necessary overhaul manuals, service bulletins, service letters, airworthiness directives, applicable selections of the GOM, and any other required technical data.
12. Maintains all necessary work records and logbooks, including certification in the aircraft permanent maintenance records that the aircraft is approved for return to service.
13. Maintains the weight and balance records for all aircraft.
14. Completes the required MRR and MIS reports and submits them to the Director of Operations for forwarding to the FAA.

9.2.4 Pilot in Command

The Southeast Aviation LLC GOM listed the following responsibilities for the PIC:

1. Keep his or her assigned navigation charts current and up to date.
2. Keep his or her assigned copy of the GOM up to date.
3. Report for duty not less than 30 minutes prior to dispatch time. This is for the accomplishment of preflight inspections and paperwork.
4. Notify the Director of Operations whenever the pilots may violate any rule due to being dispatched on a flight.

5. Notify the Director of Operations whenever a medical deficiency exists that would affect the safety of flight.

9.2.5 Flight Follower

According to the Southeast Aviation LLC GOM, when operating as an Air Carrier, the company shall comply with the requirements of a flight following system. Within a flight following system the air carrier is not required to be able to establish radio contact with a flight while en route. The Flight Follower must, however, concur with the PIC that a flight can be conducted safely before the flight may be initiated. This requirement necessitates a suitable means of communication between the Flight Follower and the PIC at each point of departure.⁷⁸

The owner of Southeast Aviation LLC was acting as the Flight Follower for the accident flight. According to the Southeast Aviation LLC GOM, Flight Followers will be employees of the company and shall keep track of each aircraft through the daily flight log, and if there is any delay in the return of an aircraft the flight follower shall notify the Director of Operations. According to the owner of Southeast Aviation LLC, he used Spidertracks as his primary means of following the accident flight after departure.

According to the Southeast Aviation LLC GOM, the Flight Follower duties included the following, in part:

1. The Flight Follower will coordinate FAR 135 operations and monitor FAR Part 91 operations. They will be responsible for adherence to all applicable Federal and Company regulations and policies and will keep the Captain fully informed of all flight, traffic, and airport conditions pertinent to the safety and completion for the flight.
2. The flight Follower is responsible for solutions for operational problems caused by cancellations, delays, diversions and mechanical interruptions.
3. Each Flight Follower on duty will remain on duty until each flight released by him has terminated or until properly relieved by another Flight Follower.
4. A Flight Follower will monitor each pilot's flight and duty time throughout the day to assist the pilots in determining that they are within their legal rest, duty, and flight time limitations.
5. Flights may only depart to an airport if the appropriate weather reports and forecasts or combination thereof indicate that the destination and the weather conditions at the estimated arrival time at each airport will be at or above authorized minimums.
6. No flight may depart unless both the Captain and the Flight Follower are thoroughly familiar with the reported and forecast weather and considering all factors and conditions.

9.3 Operational Control

According to the Southeast Aviation LLC GOM, Operational Control is defined in FAR 1 as "the exercise of authority over initiating, conducting and terminating a flight." Operational Control is

⁷⁸ Title 14 *CFR* Part 135.79 Flight Locating Requirements stated the following in part: (a) *Each certificate holder must have procedures established for locating each flight, for which an FAA flight plan is not filed.* The accident pilot had filed a VFR flight plan with the Ketchikan FSS for the accident flight.

exercised through both active and passive means. Passive control consists of developing and publishing policies and procedures for operational control personnel and flight crews to follow in the performance of their duties and assuring adequate information and facilities are available to conduct planned operation. Active control consists of making those decisions and performing those actions necessary to operate a specific flight such as crew scheduling, accepting charter flights from the public, reviewing weather and NOTAMs, and flight planning.

Southeast Aviation LLC was responsible for ensuring that both flight crew and operational control employees complied with published policies and procedures.

According to the Southeast Aviation LLC Operations Specifications A007, the Director of Operations was listed as the certificate holder's Agent for Service. It also listed the Director of Maintenance, Director of Operations and Chief Pilot as Management Personnel for Southeast Aviation LLC. The Director of Operations and Chief pilot were required to be direct employees of Southeast Aviation LLC (certificate holder).⁷⁹

The Southeast Aviation LLC Operations Specification A008 stated the following, in part:

(6) Management Personnel and Persons Authorized to Exercise Operational Control.

(a) Prior to conducting a Part 135 flight or series of flights, at least one management person who is a direct employee listed in operations specification A006, Management Personnel, or a management person designee who is a direct employee of the certificate holder, other than a pilot assigned to the specific flight or series of flights, must determine and have sufficient knowledge of the following:

(i) Whether each assigned crewmember is qualified and eligible to serve as a required crewmember in the aircraft and type of operation to which the crewmember is assigned (see subparagraph d(1)(b) above); and

(ii) Whether the aircraft assigned for use is listed in operations specification D085 and is airworthy under the certificate holder's FAA-approved maintenance, inspection, or airworthiness program, as appropriate.

(b) Prior to conducting a Part 135 flight or series of flights, at least the pilot assigned in accordance with subparagraph d(6)(a)(i) above must determine and have sufficient knowledge of the following:

(i) Whether a Part 135 flight or series of flights can be initiated, conducted, or terminated safely and in accordance with the authorizations, limitations, and procedures approved in the certificate holder's operations specifications, general operations manual (GOM), or subparagraph a above and the appropriate regulations.

(ii) Notwithstanding the requirements of subparagraph d(6)(a) above, this determination and knowledge described in subparagraph d(6)(b)(i) above may be made for the certificate holder by pilots and/or flightcrew members assigned to a flight or series of flights, in accordance with the policies, procedures, and standards prescribed by the certificate holder.

⁷⁹ The Director of Maintenance was not required to be a direct employee of Southeast Aviation LLC, per Operation Specifications A006. The Southeast Aviation LLC Director of Maintenance held the same position for multiple Part 135 operators in Ketchikan, Alaska.

(A) Such non-management persons must meet the requirements of § 119.69(d), and their names, titles, and duties, responsibilities, and authorities must be specified in the GOM, or described in subparagraph a above; or (B) For those certificate holders issued operations specification A039 or A040, the persons listed in those operations specifications must determine and have sufficient knowledge of whether a Part 135 flight or series of flights can be initiated, conducted, or terminated safely in accordance with the authorizations, limitations, and procedures approved in subparagraph a above and in accordance with the appropriate regulations.

(7) Operational Control Information Requirements.

(a) Prior to the certificate holder conducting any flight operation under Part 135, the certificate holder must provide information to the designated PIC that indicates which flight or series of flights will be conducted under Part 135, that indicates which Part 91 flights will be conducted by the certificate holder, and that the certificate holder is accountable and responsible for the safe operations of these flights or series of flights. For those issued operations specification A039 or A040 the pilots listed in those operations specifications are accountable and responsible for the safe operations of these flights or series of flights.

(b) The system of operational control for Part 135 operations must ensure that each pilot is knowledgeable that the failure of a pilot to adhere to the certificate holder's directions and instructions, or compliance with directions or instructions from an aircraft owner (other than the certificate holder), or any other outside private person or private entity, that are contrary to the certificate holder's directions or instructions, while operating aircraft under these operations specifications, may be contrary to Parts 119 and/or 135, and therefore may be subject to legal enforcement action by the FAA.

(c) These requirements do not apply to the following:

- (i) ATC instructions, clearances and NOTAMs received from FAA or cognizant foreign ATC authorities,*
- (ii) Aeronautical safety of flight information received by the pilot, and*
- (iii) Operation under the emergency authority of the PIC in accordance with Part 91, § 91.3(b), and /or Part 135, § 135.19(b).*

The Southeast Aviation LLC GOM listed the General Manager (owner), Director of Operations and Chief Pilot as having full operational control.⁸⁰ The GOM further stated that Southeast

⁸⁰ As a result of the June 25, 2015, accident in which a Pro-Mech DHC-3 Otter airplane collided with mountainous, tree-covered terrain about 24 miles east-northeast of Ketchikan, Alaska (NTSB Accident Report NTSB/AAR-17/02), the NTSB issued safety recommendations A-17-35 to -43 to the FAA. Safety Recommendation A-17-39 stated: *Establish minimum initial and recurrent training requirements for personnel authorized to exercise operational control, including, but not limited to, approved subject knowledge areas, training hours, subject hours, and*

Aviation LLC pilots were authorized to conduct and terminate flights. A current list of pilots was kept on a white board at the Southeast Aviation LLC office in Ketchikan, Alaska.

10.0 Relevant Systems

See Airworthiness Group Chairman's Factual Report in the Docket for this accident.

11.0 Relevant Procedures

The Southeast Aviation LLC GOM established the procedures and policies that were acceptable to the FAA. One current copy of the manual was required to be maintained at the principal operations base, and copies of the GOM (including all changes and additions) were required to be made available to all flight crewmembers, maintenance personnel, and ground operations personnel. Per 14 *CFR* 135.293(a)(1), all Southeast Aviation LLC pilots were required to be tested annually on their knowledge of the GOM.

11.1 Standardization of Flight Procedures

The Southeast Aviation LLC GOM stated the following, in part:

Crewmembers will at all times adhere to published standardized procedures in the conduct of flights. This will ensure that company aircraft will be operated according to procedures that the company deems safest. Standardization also facilitates crewmember expectations of other crewmembers, thereby maximizing crew coordination and efficiency, regardless of changes in crew pairings.

The substitution of procedures of personal preference, for those established by Southeast Aviation LLC, is considered a serious breach of the code of conduct expected of a Captain. Continued infractions after being otherwise counseled may result in termination of employment.

12.0 Tongass Aircraft Pilots Association

Local Ketchikan sightseeing operators worked with the FAA and developed voluntary safe operating procedures for commercial flights in Ketchikan and the Misty Fjords National Monument areas. The Tongass Aircraft Pilots Association (TAPA) was formed to address safety issues, air traffic congestion, communications and noise considerations in Ketchikan, Tongass Narrows, and the Misty Fjords National Monument.

A voluntary Ketchikan Commercial Operators letter of agreement (LOA) was drafted that described in part, standard Misty Fjords National Monument tour routes, frequencies, altitudes, reporting points, choke points, non-standard Misty Fjords National Monument routes and best

qualification modules. The Recommendation status is currently listed as Open – Unacceptable Response. Safety Recommendation A-17-40 stated: *Publish an advisory circular that provides guidance on operational control best practices, including, but not limited to, such areas as risk mitigation strategies, joint flight safety responsibilities, prior experience of operational control personnel, and operational control personnel duty time limitations.* The Recommendation status is currently Open - Acceptable Response.

practices. The initial LOA between the operators was originally dated January 15, 2009, and revised May 15, 2019 and May 8, 2021.

Southeast Aviation LLC was a signatory on the LOA.⁸¹

13.0 FAA Oversight

FAA oversight of the Southeast Aviation LLC's Part 135 certificate was through the Juneau, Alaska FSDO office. The POI, PMI and PAI (Principal Avionics Inspector) were based in Juneau, Alaska and the PMI resided in Ketchikan, Alaska.

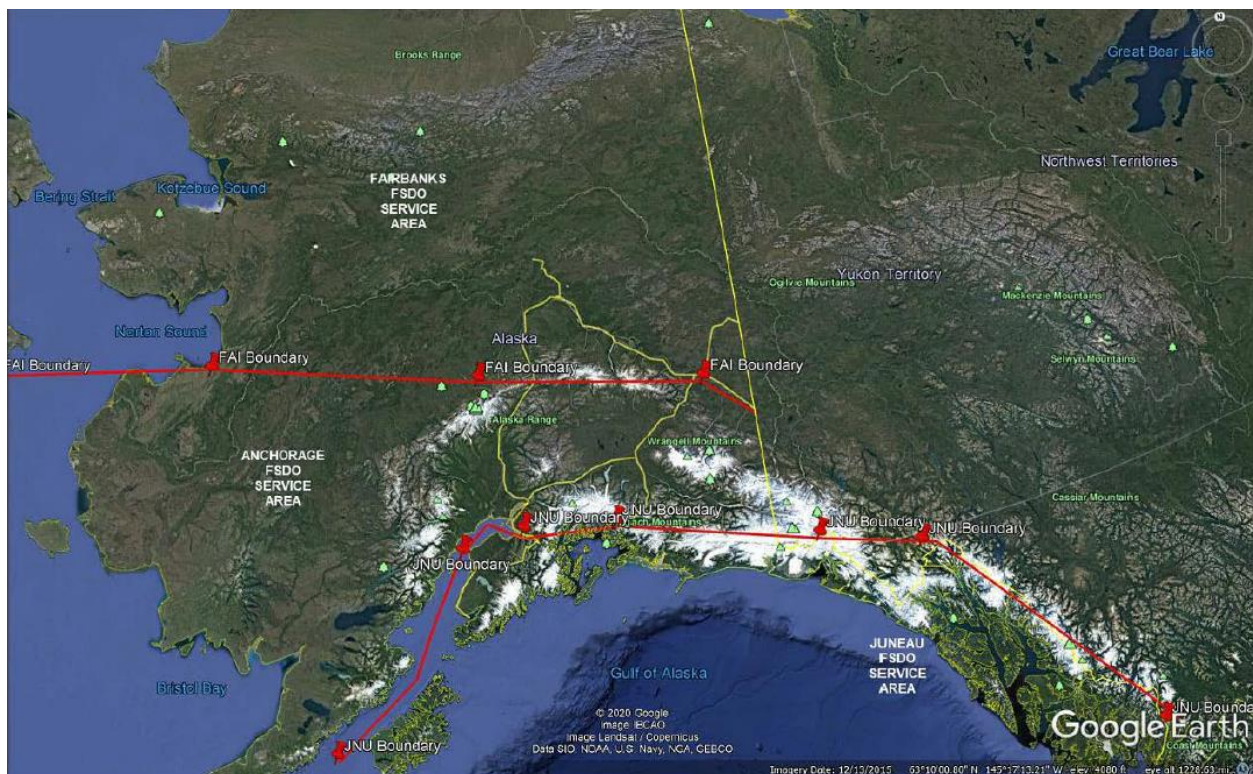


Figure 11: FAA Alaska Service Area map.⁸²

The POI and PMI used the FAA Safety Assurance System (SAS) to conduct oversight of Southeast Aviation LLC. The SAS is the FAA's oversight tool to perform certification, surveillance, and Continued Operational Safety (COS). Oversight is a function performed by the FAA to assure the highest level of safety in National Airspace System (NAS) by verifying that an aviation organization or designee complies with and uses safety-related standards, regulations, and associated procedures. SAS includes policy, processes, and associated software the FAA Flight Standards Service (FS) uses to capture data when conducting oversight. SAS was developed to satisfy the Safety Assurance component of the FAA FS internal SMS. Data Collection Tools (DCTs) are used by the FAA to collect data needed for the evaluation of the performance or design of the Certificate Holder.

⁸¹ See Attachment 13 - Ketchikan Commercial Operators LOA.

⁸² Source: https://www.faa.gov/about/office_org/field_offices/fsdo/jun/local_more/media/ServiceareaAK.pdf.

According to FAA records, for the Fiscal Year (FY) 2021 workplan for both inspectors on Southeast Aviation LLC, the POI and PMI together had eight surveillance activities (DCTs) on Southeast Aviation LLC. Two DCTs were coded 1.0 “Organizational Management” inspections conducted by the POI and PMI,⁸³ one was coded 2.0 “Flight Operations” conducted by the POI,⁸⁴ one was coded 3.0 “Operations Management” by the POI,⁸⁵ one was coded 4.0 “Technical Operations” by the PMI,⁸⁶ one was coded 5.0 “Onboard Operations” by the POI,⁸⁷ one was coded 6.0 “Ground Operations” by the PMI,⁸⁸ and one was coded 6.0 “Ground Operations” by the POI.⁸⁹

During his interview with the NTSB, the POI said he had never had any enforcement actions or negative findings for Southeast Aviation LLC. He interacted with the company owner or Director of Operations “once or twice a month.” His interactions were either normal surveillance activities or discussions about the local area, best practices and safety. He had not had the opportunity to conduct any surveillance activities on the FY2021 POI workplan for Southeast Aviation LLC since he had only recently returned to the role as POI.⁹⁰

When asked to explain the FAA’s role regarding the Ketchikan LOA, the Southeast Aviation LLC POI said it was “just to encourage operator development and improvement of the LOA. We don’t have a hand in writing the LOA.” He stated that the FAA encourages operators to participate and be signatories to the LOA, but the LOA carries no regulatory requirement.⁹¹

When asked further about the LOA, the POI stated “Well, I think that, personally, in my opinion, is that the LOA is not working,” and added “we need to move something more towards an SFAR that we have in other areas” like Hawaii and the Grand Canyon. He said he thinks it needs to be regulated.⁹²

⁸³ The FAA objective is to determine if the certificate holder (CH); (1) Met regulatory requirements, guidance, and safety performance objectives of its Organizational Management processes, and; (2) Managed safety of the Organizational Management processes by incorporating system safety principles which include safety attributes. Source: <https://fsims.faa.gov/PICDetail.aspx?docId=SP%201.0%20135C%20OP%2023.0>.

⁸⁴ The FAA objective is to determine if the CH; (1) Met regulatory requirements, guidance, and safety performance objectives of its Flight Operations processes, and; (2) Managed safety of the Flight Operations processes by incorporating system safety principles which include safety attributes.

⁸⁵ The FAA objective is to determine if the CH; (1) Met regulatory and guidance requirements of its Operations Management processes, and; (2) Managed safety of the Operations Management processes by incorporating system safety principles which include safety attributes.

⁸⁶ The FAA objective is to determine if the CH; (1) Met regulatory requirements, guidance, and safety performance objectives of its Technical Operations processes, and; (2) Managed safety of the Technical Operations processes by incorporating system safety principles which include safety attributes.

⁸⁷ The FAA objective is to determine if the CH; (1) Met regulatory requirements, guidance, and safety performance objectives of its Onboard Operations processes, and; (2) Managed safety of the Onboard Operations processes by incorporating system safety principles which include safety attributes.

⁸⁸ The FAA objective is to determine if the CH; (1) Met regulatory and guidance requirements of its Ground Operations processes, and; (2) Managed safety of the Ground Operations processes by incorporating system safety principles which include safety attributes.

⁸⁹ The FAA objective is to determine if the CH; (1) Met regulatory and guidance requirements of its Ground Operations processes, and; (2) Managed safety of the Ground Operations processes by incorporating system safety principles which include safety attributes.

⁹⁰ See Attachment 1 – Interview Transcripts.

⁹¹ See Attachment 1 – Interview Transcripts.

⁹² See Attachment 1 – Interview Transcripts.

During her interview with the NTSB, when the PMI for Southeast Aviation LLC was asked by the FAA Party Coordinator for the accident investigation if the LOA was working, she then recounted a story of when she heard a fixed wing air tour operator over the radio flying over the Ketchikan Lakes region contrary to the LOA, and when she contacted the operator of the aircraft when they returned to their base and asked them why they were in there because the LOA specifically said no, they told her well, the LOA is only voluntary. She then said, “there you go.”⁹³

On March 25, 2021 the FAA held a pre-season Air Safety Meeting with Alaska air tour operators.⁹⁴

On September 29, 2021, the FAA held a post-season Air Safety Meeting with Alaska air tour operators.⁹⁵

On September 30, 2021, the FAA published the Alaska Aviation Safety Initiative FY2021 Final Report. The report included safety initiatives, recommendations and stakeholder comments. The report did not include SFAR recommendations for the Ketchikan, Alaska air tour industry.⁹⁶

F. Past Accident Data

14.0 Past Part 135 Accidents (Alaska)

The following chart depicts the number of Part 135 accidents in Alaska in the NTSB database between 2010 and 2021, with breakdowns for fatal/nonfatal injuries and the top 10 defining

⁹³ See Attachment 1 – Interview Transcripts.

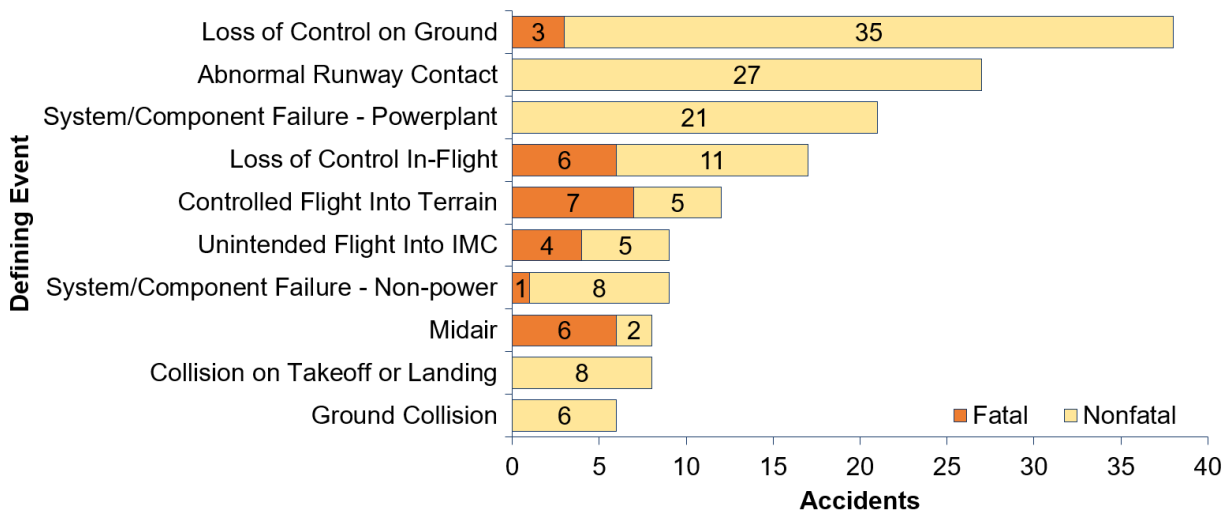
⁹⁴ See Attachment 18 - 2021 Alaska Preseason Air Safety Meeting for the FAA presentations made at this meeting.

⁹⁵ For an agenda of this meeting, see Attachment 12 - 2021 Post-Season Meeting (Agenda).

⁹⁶ To review the complete copy of this final report, see Attachment 14 - FAA Alaska Aviation Safety Initiative FY2021 Final Report.

events identified in each accident.

Part 135 Accidents in Alaska: 2010–2021



- Top 10 defining events account for 77% of accidents

Figure 12: Past 135 accident in Alaska: 2010-2021 chart.⁹⁷

15.0 Past Part 135 Accidents (Overall)

The following chart depicts the overall number of Part 135 accidents in the NTSB database between 2010 and 2019, with breakdowns for fatal/nonfatal injuries and the top 10 defining events identified in each accident.⁹⁸

⁹⁷ Source: NTSB.

⁹⁸ Source: NTSB.

On-Demand Part 135 Operations: 2010–2019

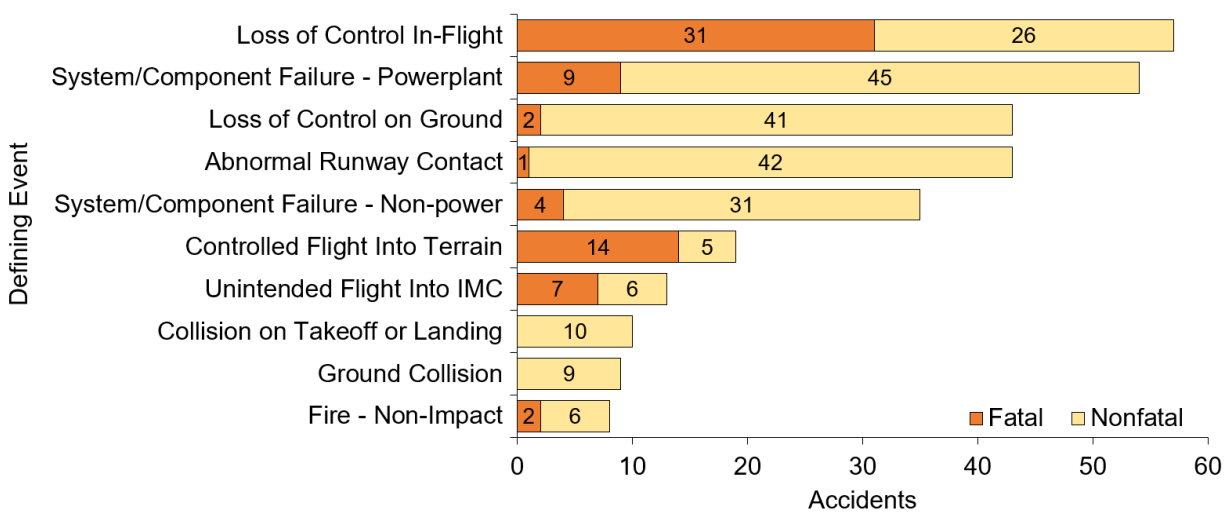


Figure 13: On-demand Part 135 operations 2010-2019 chart.⁹⁹

16.0 Past Ketchikan Accidents

The investigation conducted a search of the NTSB CAROL (Case Analysis and Reporting Online) and Aviation Accident databases for accident investigations that listed Ketchikan as the location of the accident.¹⁰⁰ The following table provides the NTSB case number, event date and time, location, aircraft registrations involved in the aviation accidents, and breakdown of injuries sustained in each accident (fatal, serious or minor).

While the July 9, 2021 accident occurred in Coffman Cove, Alaska, it is included in this list as it involved the accident pilot in this investigation operating for Southeast Aviation LLC.

⁹⁹ Source: NTSB.

¹⁰⁰ The NTSB defines a reportable “accident” as “an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.” See Title 49, *CFR* 830.5.

NTSB Case	EventDate	City	State	N#	Fatal	Serious	Minor	135 Operator
ANC21FA069	8/5/2021	Ketchikan	Alaska	N1249K	5	0	0	Y
ANC21LA057	7/9/2021	Coffman Cove	Alaska	N9279Z	0	0	0	Y
ANC20CA068	7/10/2020	Ketchikan	Alaska	N878CB	0	0	0	Y
ANC19FA033	7/11/2019	Ketchikan	Alaska	N5840P	1	0	0	
ANC19LA028	6/27/2019	Ketchikan	Alaska	N94DC	0	0	0	Y
CEN19MA141	5/13/2019	Ketchikan	Alaska	N952DB, N959PA	6	9	1	Y
GAA18CA321	6/1/2018	Ketchikan	Alaska	N203KL	0	0	6	Y
ANC17LA032	6/18/2017	Ketchikan	Alaska	N930TG	0	0	7	Y
GAA17CA200	3/22/2017	Ketchikan	Alaska	N264P	0	0	0	Y
GAA16CA009	10/6/2015	Ketchikan	Alaska	N779DZ	0	0	0	Y
ANC15MA041	6/25/2015	Ketchikan	Alaska	N270PA	9	0	0	Y
ANC14CA061	7/26/2014	Ketchikan	Alaska	N400HU	0	0	0	
ANC12CA060	7/2/2012	Ketchikan	Alaska	N1018A	0	0	0	Y
ANC12CA045	6/2/2012	Ketchikan	Alaska	N3235J	0	0	0	
ANC12LA026	3/13/2012	Ketchikan	Alaska	N82SF	0	1	1	Y
ANC10FA064	7/23/2010	Ketchikan	Alaska	N9290Z	1	0	0	Y
ANC07MA083	8/16/2007	Ketchikan	Alaska	N345KA	5	4	0	Y
ANC05LA010	10/12/2004	Ketchikan	Alaska	N166EH	0	0	0	
				Totals:	27	14	15	

Table 2: NTSB Ketchikan accident investigations chart.¹⁰¹

G. Special Federal Aviation Regulations (SFARs)

According to the FAA, an SFAR pertaining to airspace is typically a temporary rule to address a temporary situation. It is generally not used to replace or enforce regulations that are to remain in effect for many years. Consequently, an SFAR typically has an expiration date, usually no more than 3 years from its effective date. SFARs are listed at the beginning of the most relevant *CFR* and may be cross-referenced to other regulations. SFARS can prohibit, restrict, or have additional requirements to operate in the airspace the SFAR applies to. SFARs can cover a broad range of topics.¹⁰² Ketchikan, Alaska does not have an SFAR covering air tour operations in the Misty Fjords.¹⁰³

The FAA can also issue Emergency Air Traffic Rules when authorities determine there is (or will be) an emergency condition affecting the FAA's ability to operate the air traffic control system with the necessary level of safety and efficiency. The Administrator (FAA) may issue an air traffic

¹⁰¹ Source: NTSB.

¹⁰² Source: https://www.faasafety.gov/gslac/ALC/course_content.aspx?cID=42&sID=244.

¹⁰³ As a result of the June 25, 2015, accident in which a Pro-Mech DHC-3 Otter airplane collided with mountainous, tree-covered terrain about 24 miles east-northeast of Ketchikan, Alaska (NTSB Accident Report NTSB/AAR-17/02), the NTSB issued safety recommendations A-17-35 to -43. Recommendation A-17-43 stated: *Develop and implement special operating rules for the Ketchikan air tour industry that include en route visual flight rules weather minimums that are tailored to the industry's unique requirements and are more conservative than those specified in Part 135.* The recommendation status is currently Open-Unacceptable Response.

rule with immediate effect – that is, a rule that does not go through the normal rule making processes.¹⁰⁴

According to the FAA, Air Tour operations are conducted in all parts of the United States over various types of terrain. This terrain includes, but is not limited to, national parks, fairgrounds, and urban, coastal, and mountainous areas that range from unpopulated to densely populated. The operators conducting these flights as a regular part of their business are commonly known as air tour operators, and their operations are often referred to as commercial air tours.

Commercial air tours vary in many ways, but certain characteristics apply to nearly all: (1) A single pilot typically conducts the flight during daylight hours in a single engine airplane or helicopter; (2) flights are typically conducted in visual meteorological conditions, often without radar coverage or traffic advisories from an air traffic control facility; (3) flights may be conducted near popular scenic areas geographically limited in size and in dense air traffic in which the mix of airplanes and helicopters may have different flight characteristics (e.g., speed and maneuverability). Because of all these factors and characteristics, a pilot must use heightened vigilance and greater precision in navigation to conduct a commercial air tour successfully and safely.¹⁰⁵

In addition, terrain is often a major factor considered in a safely conducted flight. Many popular scenic areas are located in remote, rugged terrain where the attraction is the natural beauty of the site. To view the natural beauty, commercial air tours are normally conducted at relatively low altitudes, between 500 and 1,500 feet agl. Flights conducted at these altitudes may be close to obstructions and often are alongside higher terrain. In addition, many air tour operators conduct flights over water. When the terrain factor is added to those discussed above, you have a unique industry needing equally unique regulations to ensure a safe and pleasurable experience for the passenger.¹⁰⁶

Currently, commercial air tours beyond 25 statute miles of the departure airport, and most commercial air tours over a unit of the national park system, must be conducted by someone certificated under *CFR* Part 119, Certification: Air Carriers and Commercial Operators. These commercial air tours must operate in accordance with either Part 121; Operating Requirements: Domestic, Flag, and Supplemental Operations, or Part 135; Operating Requirements: Commuter and On Demand Operations and Rules Governing Persons On Board Such Aircraft. Parts 121 and 135 contain operational, safety, and training rules that are not limited to air tour operations.

17.0 Hawaii SFAR 71

In 1994, the FAA issued SFAR 71 as an emergency final rule because of the increase in the number of fatal accidents involving air tour aircraft during the period 1991-1994 and the causes of those accidents in Hawaii. SFAR 71 established procedural, operational, and equipment safety

¹⁰⁴ Source: https://www.faa.gov/gslac/ALC/course_content.aspx?cID=42&sID=244. See also Section 8.0 of this Factual Report that discusses Ketchikan International Airport special communications requirements outlined in Title 14 *CFR* Part 93 Subpart M - Ketchikan International Airport Traffic Rule.

¹⁰⁵ Source: <https://www.govinfo.gov/content/pkg/FR-2007-02-13/pdf/07-580.pdf>.

¹⁰⁶ Source: <https://www.govinfo.gov/content/pkg/FR-2007-02-13/pdf/07-580.pdf>.

requirements for air tour aircraft in the state of Hawaii. The FAA extended the SFAR in 1997 and 2000 to keep the SFAR's safety requirements in place. There were Congressional concerns that noise could be addressed at the same time, but according to the FAA, noise was not the reason for issuing the rule and the FAA said its mandate for this rulemaking was safety.

To address the unique circumstances surrounding air tour operations, the FAA published a notice of proposed rulemaking (NPRM) in the Federal Register on October 22, 2003 (68 FR 60572 (/citation/68-FR-60572)). The proposed rule was modeled on SFAR 71, which governed the commercial air tour industry in Hawaii.

The National Air Tour Safety Standards, published February 13, 2007, incorporated the language of SFAR 71 into Appendix A of Part 136.¹⁰⁷

Title 14 *CFR* Appendix A to Part 136 - Special Operating Rules for Air Tour Operators in the State of Hawaii includes regulations covering helicopter flotation equipment, helicopter performance plans, helicopter operating limitations, passenger briefings and minimum flight altitudes.¹⁰⁸

18.0 Grand Canyon SFAR 50

Following a June 18, 1986 mid-air collision between two air tour aircraft that resulted in 25 fatalities¹⁰⁹ and focused widespread attention on the issue of air tour flights over the Grand Canyon, in March 1987 the FAA established SFAR 50 for the Grand Canyon airspace.¹¹⁰

After numerous legal challenges and revisions, the current language of SFAR 50 is dated March 5, 2018, and includes regulations covering airspace limitations, aircraft operations, flight-free zones, and minimum flight altitudes.

H. LIST OF ATTACHMENTS

Attachment 1 - Interview Transcripts
Attachment 2 - Flight Manifest
Attachment 3 - Witness Reports
Attachment 4 - Pilot Training Records
Attachment 5 - Pilot 2021 Season Work Schedule
Attachment 6 - N1249K FAA Registration Information
Attachment 7 - DHC-2 Beaver Checklist

¹⁰⁷ Source: Federal Aviation Administration (<https://www.federalregister.gov/agencies/federal-aviation-administration>).

¹⁰⁸ Section 6 of SFAR 71 stated the following: *Except when necessary for takeoff and landing, or operating in compliance with an air traffic control clearance, or as otherwise authorized by the Administrator, no person may conduct an air tour in Hawaii: (a) Below an altitude of 1,500 feet above the surface over all areas of the State of Hawaii, and, (b) Closer than 1,500 feet to any person or property; or, (c) Below any altitude prescribed by federal statute or regulation.*

¹⁰⁹ See NTSB case #DCA86AA028B.

¹¹⁰ Source: 66 Federal Register (FR) 1003, January 4, 2001, as amended at 66 FR 16584, March 26, 2001; 72 FR 9846, March 6, 2007; Docket FAA-2018-0119, Amdt. 91-350, 83 FR 9171, March 5, 2018]

Attachment 8 - N1249K Airplane Flight Manual Excerpts
Attachment 9 - KTN Charts
Attachment 10 - KTN Part 93
Attachment 11 - Ketchikan Sectional Chart
Attachment 12 - 2021 Post-Season Air Safety Meeting (Agenda only)
Attachment 13 - Ketchikan Commercial Operators LOA
Attachment 14 - FAA Alaska Aviation Safety Initiative FY2021 Final Report
Attachment 15 - KTN Filed Flight Plan Data Charts
Attachment 16 - Weight and Balance Information
Attachment 17 – Subpoenas
Attachment 18 - 2021 Alaska Preseason Air Safety Meeting
Attachment 19 – Record of Conversations

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